
4B.3 BIOLOGICAL RESOURCES

4B.3.2 Terrestrial Vegetation and Wetlands

4B.3.2.1 Alternative B – CPAI Development Plan Impacts on Terrestrial Vegetation and Wetlands

Figures 4B.3.1-1 and 4B.3.1-2 show the vegetation and habitats affected, and Tables 4B.3.1-1 and 4B.3.1-2 summarize the area of vegetation types and habitats affected under the CPAI Development Plan Alternative B. All impacts under the CPAI Development Plan Alternative B would be to wetlands. Oil spills, should they occur, would also directly or indirectly affect vegetation and wetlands in the Plan Area. Oil and chemical spills and the potential for spills in the Plan Area are described in Section 4.3.

Construction Period

The construction period includes gravel placement, grading of the gravel surface, placement of all facilities, and initial drilling.

Gravel Pads, Roads, and Airstrips

Under Alternative B, a total of approximately 195 acres of vegetation would be covered with gravel fill for the construction of well pads, connecting roads, and airstrips. See Tables 4A.3.1-1, 4B.3.1-1, 4C.3.1-1, and 4D.3.1.1-1 for a comparison of impacts to vegetation classes and Tables 4A.3.1-2, 4B.3.1-2, 4C.3.1-2, and 4D.3.1-2 for a comparison of impacts to habitat types in the Plan Area. Abandonment of roads, pads, and airstrips is discussed in Section 2.3. In addition to impacts from roads, pads, and an airstrip, some vegetation would be lost for the construction of a boat launch ramp at either CD-2 or CD-4 and the associated access road and a floating dock and access road at CD-3 as described in Section 2.3. The vegetation and habitat types affected by construction of a boat ramp and floating dock are described under the CPAI Development Plan Alternative A. Mitigation measures identified for impacts from gravel pads, roads, and airstrips would also be the same as those described for Alternative A.

Proposed gravel sources, associated impacts, and mitigation measures would be the same as those described under Alternative A, although the vegetation affected by gravel mining would be reduced in rough proportion to the reduction in gravel requirements.

Dust Fallout from Roads

Under Alternative B, potential impacts from dust would result in alteration of about 136 acres of tundra vegetation, assuming that these impacts occur only within 35 feet of roads and pads. Tables 4B.3.1-1 and 4B.3.1-2 summarize the surface area of vegetation and habitat types affected by dust. See Tables 4A.3.1-1, 4C.3.1-1, and 4D.3.1-1 for a comparison of dust impacts to vegetation classes and Tables 4A.3.1-2, 4C.3.1-2, and 4D.3.1-2 for a comparison of dust impacts to habitat types in the Plan Area. Alternatives B and D would have the least amount of impacts from dust because of their mostly roadless designs. The type of impacts from dust and associated mitigation measures would be the same as those described under the CPAI Development Plan Alternative A.

Ice Roads, Ice Pads, and Snow Stockpiles

Under Alternative B, a total of about 233 miles of ice roads would be constructed (during the construction period) over the life of the project, resulting in a maximum of approximately 1,130 acres of vegetation disturbed. This is a maximum-case scenario that assumes the ice roads would be built in a different location each year. The maximum area covered by ice roads in a single year would be 290 acres, with an average of 190 acres per year. The actual surface area disturbed would likely be much less, especially if ice roads are overlapped in subsequent years to minimize the areal extent of impacts. (Preliminary analysis of recent data,

however, suggests that vegetation can display increased impacts from overlapping ice roads.) Ice roads placed for the construction of gravel roads and pipeline would follow adjacent to the road/pipeline routes and would tend to affect the same habitat and vegetation types (see Tables 4B.3.1-1 and 4B.3.1-2).

**TABLE 4B.3.1-1 ALTERNATIVE B – SUMMARY OF SURFACE AREA (ACRES) OF
VEGETATION CLASSES AFFECTED**

Vegetation Classes	Colville Delta				NPR-A (Western Beaufort Coastal Plain)			
	Loss		Alteration		Loss		Alteration	
	Roads	Pads ^a	Dust ^b	Power Line Trenching	Roads	Pads ^a	Dust ^b	Power Line Trenching
Water	8.808		11.054	0.260	2.450	0.144	2.944	0.066
Riverine Complex								
Fresh Grass Marsh	4.347		4.361					
Fresh Sedge Marsh					3.226	1.313	4.656	0.031
Deep Polygon Complex		5.821	2.275	0.039				
Young Basin Wetland Complex					2.873	0.702	3.830	0.047
Old Basin Wetland Complex					4.996	0.015	5.905	0.216
Wet Sedge Meadow Tundra	5.489	38.160	16.702	0.823	3.011	23.430	10.785	0.204
Salt-killed Wet Meadow								
Halophytic Sedge Wet Meadow								
Halophytic Grass Wet Meadow								
Moist Sedge Shrub Tundra	7.554		10.550	0.013	15.060	28.390	28.520	0.407
Tussock Tundra					20.010	10.799	30.010	0.441
Dryas Dwarf Shrub Tundra				0.009				
Cassiope Dwarf Shrub Tundra								
Halophytic Willow Dwarf Shrub Tundra								
Open and Closed Low Willow Shrub	0.518		0.735	0.067	1.637	2.336	2.485	0.001
Open and Closed Tall Willow Shrub								0.004
Dune Complex								
Partially Vegetated	3.336		1.126					
Barrens				0.064				
Total Area	30.052	43.981	46.803	1.275	53.263	67.129	89.135	1.417

Notes:

^a Total includes gravel for pads & airstrips

^b Dust impacts were calculated using a 35-foot buffer on roads, pads, & airstrips

**TABLE 4B.3.1-2 ALTERNATIVE B – SUMMARY OF SURFACE AREA (ACRES)
OF HABITAT TYPES AFFECTED**

Habitat Types	Colville Delta				NPR-A (Western Beaufort Coastal Plain)			
	Loss		Alteration		Loss		Alteration	
	Roads	Pads ^a	Dust ^b	Power Line Trenching	Roads	Pads ^a	Dust ^b	Power Line Trenching
Open Nearshore Water								
Brackish Water								
Tapped Lake with Low- water Connection				0.004				
Tapped Lake with High- water Connection	4.977		6.705	0.020				
Salt Marsh								
Tidal Flat								
Salt-killed Tundra								
Deep Open Water without Islands								
Deep Open Water with Islands or Polygonized Margins	3.673		4.218					0.001
Shallow Open Water without Islands	0.158		0.130		1.298		1.493	0.018
Shallow Open Water with Island or Polygonized Margins				0.149	1.152	0.144	1.451	0.045
River or Stream				0.041				0.002
Aquatic Sedge Marsh					3.226	1.313	4.656	0.031
Aquatic Sedge with Deep Polygons		5.821	2.275	0.046				
Aquatic Grass Marsh	4.347		4.361					
Young Basin Wetland Complex				0.039	2.873	0.702	3.830	0.047
Old Basin Wetland Complex					4.996	0.015	5.905	0.216
Riverine Complex								
Dune Complex								
Nonpatterned Wet Meadow	2.345	9.819	4.779	0.285	1.667	9.170	4.071	
Patterned Wet Meadow	3.144	28.340	11.922	0.538	1.344	14.260	6.713	0.204
Moist Sedge-Shrub Meadow	7.554		10.550	0.013	16.700	30.720	31.002	0.407
Moist Tussock Tundra					20.010	10.799	30.010	0.441
Riverine Low and Tall Shrub								0.005

**TABLE 4B.3.1-2 ALTERNATIVE B – SUMMARY OF SURFACE AREA (ACRES)
OF HABITAT TYPES AFFECTED (cont'd)**

Habitat Types	Colville Delta				NPR-A (Western Beaufort Coastal Plain)			
	Loss		Alteration		Loss		Alteration	
	Roads	Pads ^a	Dust ^b	Power Line Trenching	Roads	Pads ^a	Dust ^b	Power Line Trenching
Upland Low and Tall Shrub								
Upland and Riverine Dwarf Shrub ^c								
Riverine or Upland Shrub ^d	0.518		0.735	0.076				
Barrens (riverine, eolian, or lacustrine)	3.336		1.126	0.064				
Artificial (water, fill, peat road)								
Total Area	30.052	43.980	46.801	1.275	53.266	67.123	89.131	1.417

Notes:

^a Total includes gravel for pads and airstrips

^b Dust impacts were calculated using a 35-foot buffer on roads, pads, and airstrips

^c Mapped for NPR-A area only

^d Mapped for Colville River Delta area only

Mitigation measures for ice roads would be the same as those described under the CPAI Development Plan Alternative A.

In addition to ice roads, insulated ice pads would be used as staging areas during pipeline construction. Approximately 70 acres of vegetation would be disturbed by ice pad staging areas for the construction of the pipeline. Ice pads might also be used to stockpile overburden material associated with the ASRC Mine Site and Clover Potential Gravel Source. Impacts from these ice pads would be the same as those described under Alternative A. Ice pads also would be constructed at each end of each proposed bridge to stage equipment. These ice pads used as staging areas would vary with the size of the bridge installation and equipment needs. Given the number of bridges proposed under Alternative B and assuming the maximum pad size would be 800 feet by 800 feet surrounding the abutment structure at each end of a bridge (Section 2.3), then a maximum of 60 acres of vegetation would be affected by ice pads. Ice pads could also be built for storage of drill rigs and other equipment at remote production pads. The effects of ice pads on vegetation would be similar in type to those of ice roads. Mitigation measures for ice pads would be the same as those described under Alternative A.

Less snow would need to be plowed under Alternative B than Alternatives A and C because fewer miles of road would be built. This would result in decreased alteration of vegetation by snow stockpiles. However, Alternative B would require slightly more snow plowing than Alternative D.

Off-Road Tundra Travel

Development and operation of oil facilities in the Plan Area may require access across tundra. Such access could be necessary to respond to spills or other emergencies, conduct pipeline maintenance and repair, facilitate ice road construction, or to transport supplies and equipment to roadless development sites. The types

of impacts to vegetation from off-road travel and associated mitigation measures would be similar to those described under Alternative A; however, impacts from off-road travel would presumably be the highest for Alternatives B and D because of the mostly roadless designs. Off-road travel impacts would likely be the lowest for Alternative C because all pads and most of the pipeline would be accessible by road. Off-road travel impacts of Alternative A would be slightly less than those of Alternative C.

Impoundments and Thermokarst

The types of impacts from impoundments and thermokarst and associated mitigation measures are described under CPAI Development Plan Alternative A. Habitat alteration resulting from impoundments and thermokarst would be less extensive under Alternatives B and D because of the mostly roadless designs. The greatest amount of vegetation could potentially be affected by Alternative C because it proposes the highest number of road miles. The potential of Alternative A for impoundment and thermokarst impacts would be slightly less than for Alternative C.

Cross-Drainage and Water Flow

The types of cross-drainage and water flow impacts and associated mitigation measures are described under Alternative A. Habitat alteration resulting from interception of natural water flow by gravel roads and pads would be less extensive under Alternatives B and D because of the mostly roadless designs. The greatest amount of vegetation could potentially be affected by Alternative C because it proposes the highest number of road miles. The potential for cross-drainage and water flow impacts would be slightly less for Alternative A than for Alternative C.

Air Pollution

Project construction would cause a localized and temporary impact on air quality. The sources of air pollution during the construction period are described under Alternative A. These sources are not expected to produce sufficient levels of pollutants to affect vegetation. Air quality mitigation measures would be the same as those described under Alternative A.

Pipelines

Given the maximum diameter of VSM borings and the projected number to be constructed under Alternative B, about 0.3 acre of vegetation would be lost to VSM installation. The vegetation and habitat types affected would depend on the exact location of the VSM. The elevated pipeline design would reduce impacts to vegetation and habitat types.

Power Lines

Under Alternative B, approximately 2.7 acres of tundra vegetation would be affected by trenching for buried power lines.

Operation Period

The operation period includes continued drilling and day-to-day operations and maintenance once production has begun.

Gravel Pads, Roads, and Airstrips

Most loss and alteration of vegetation communities would occur during the construction period and would be related to gravel placement. Additional vegetation losses could occur during the operation period during maintenance of gravel roads (such as snow removal) or if flood events wash out portions of roads or pads and

deposit gravel downstream. The impacts from these activities and events are described under the CPAI Development Plan Alternative A.

Impacts to vegetation resulting from maintenance of gravel roads and wash-outs would be less extensive under Alternatives B and D because of the mostly roadless designs. The greatest amount of vegetation could potentially be affected by Alternative C because it proposes the highest number of road miles. The impacts from maintenance of gravel roads and wash-outs in Alternative A would likely be slightly less than in Alternative C.

Dust Fallout from Roads

Although traffic is expected to be higher during the construction season, over the life of the project dust impacts from roads are expected to be greater during the operation period. The effects of dust on vegetation are described in the Construction Period section above.

Ice Roads, Ice Pads, and Snow Stockpiles

Under Alternative B, ice roads would be needed every few years during the life of the facility to support well workovers and other drilling activities at remote sites (CD-3, CD-5, and CD-6). Ice pads would not likely be needed during operations. A total of about 30 miles of ice roads would be constructed (during operations) over the life of the project, resulting in a maximum of approximately 145 acres of vegetation being disturbed. This is a maximum-case scenario that assumes the ice roads would be built in a different location each year. The maximum area covered by ice roads in a single year and the average acres affected per year would be about 25 acres. The actual surface area disturbed would likely be much less, especially if ice roads are overlapped in subsequent years to minimize the areal extent of impacts. Ice roads placed for the construction of gravel roads and pipeline would follow adjacent to the road/pipeline routes and would tend to affect the same habitat and vegetation types (Tables 4B.3.1-1 and 4B.3.1-2). Mitigation measures for ice roads would be the same as those described under Alternative A.

As during the construction period, snowdrifts or plowed snow would accumulate on tundra adjacent to roads, well pads, and airstrips. Impacts would be similar to those discussed above in the Construction Section.

Off-Road Tundra Travel

Some off-road tundra travel would continue during the operation period to respond to spills or other emergencies, to conduct pipeline maintenance and repair, to facilitate ice road construction, or to transport supplies and equipment to roadless development sites. See the Construction Period discussion above for potential impacts.

Impoundments and Thermokarst

Although there is a potential for some habitat loss and alteration to occur from thermokarst and the creation of impoundments during the operation period of the project, these impacts are more likely to be initiated during construction. Therefore, the factors causing vegetation loss and alteration are discussed above in the Construction Period section.

Cross-Drainage and Water Flow

Cross-drainage and water flow impacts are not expected to occur during the operational phase of this project.

Air Pollution

Air pollution levels would increase during operations with the upgrade of the existing Alpine CPF and increased emissions from traffic, drilling equipment, and well servicing equipment; however, this increase is not expected to generate levels of pollutants that would affect vegetation. Air quality impacts caused by

emissions from well servicing and drilling equipment would be intermittent and localized. Air quality mitigation measures would be the same as those described under Alternative A.

Pipelines

Pipeline operation would not cause vegetation losses or alteration. However, routine maintenance and occasional larger-scale pipe repairs that could be required during the thawed season could result in additional tundra damage from equipment needed to conduct the repair work. Tundra travel is discussed above. Additionally, indirect impacts discussed above in the Construction Period section, associated with snow drifting and shading, would continue to occur during the operation period.

Power Lines

No additional impacts to vegetation would occur from power lines during the operation period.

4B.3.2.2 Alternative B – Full-Field Development Plan Impacts on Terrestrial Vegetation and Wetlands

Under the Alternative B scenario for FFD, direct and indirect impacts to vegetation related to gravel fill; dust fallout from roads; ice roads and snow stockpiles; off-road tundra travel; impoundments and thermokarst; cross-drainage and water flow; air pollution; pipelines; and power lines in the three facility groups would be the same types as those described under CPAI Development Plan Alternative A. In addition to the impacts of CPAI Development Plan Alternative A, under the FFD scenario for Alternative B approximately 1,150 acres of vegetation would be covered with gravel fill and approximately 250 acres could be disturbed by gravel mining operations. Table 4B.3.1-3 summarizes the areas of vegetation types affected under FFD Alternative B from placement of gravel fill. The effects of FFD on terrestrial vegetation and wetlands would depend on the location and extent of development in specific locations within each facility group.

TABLE 4B.3.1-3 SUMMARY OF VEGETATION IMPACTS FOR FFD ALTERNATIVE B

Vegetation Classes	Colville River Delta			Fish-Judy Creeks			Kalikpik-Kogru		
	Acres (%) in Colville River Delta	Gravel (Acres)	Dust (Acres)	Acres (%) in Fish-Judy Creek	Gravel (Acres)	Dust (Acres)	Acres (%) in Kalikpik-Kogru	Gravel (Acres)	Dust (Acres)
Riverine Complex	0 (0.0%)	0	0	35 (0.1%)	0	0	0 (0.0%)	0	0
Fresh Grass Marsh	56 (0.3%)	1	0	257 (0.6%)	4	1	49 (0.3%)	1	1
Fresh Sedge Marsh	3 (0.0%)	0	0	3,308 (7.9%)	45	18	1,296 (8.5%)	26	21
Deep Polygon Complex	550 (2.6%)	7	2	4,833 (11.6%)	66	26	1,417 (9.3%)	28	23
Young Basin Wetland Complex	0 (0.0%)	0	0	2,115 (5.1%)	29	11	650 (4.2%)	13	11
Old Basin Wetland Complex	0 (0.0%)	0	0	1,411 (3.4%)	19	8	0 (0.0%)	0	0
Wet Sedge Meadow Tundra	9,494 (44.1%)	123	35	8,951 (21.5%)	122	48	5,987 (39.1%)	118	97
Salt-killed Wet Meadow	1,633 (7.6%)	21	6	0 (0.0%)	0	0	0 (0.0%)	0	0
Halophytic Sedge Wet Meadow	1,210 (5.6%)	16	4	0 (0.0%)	0	0	0 (0.0%)	0	0
Halophytic Grass Wet Meadow	32 (0.1%)	0	0	0 (0.0%)	0	0	0 (0.0%)	0	0
Moist Sedge Shrub Tundra	782 (3.6%)	10	3	3,308 (7.9%)	45	18	0 (0.0%)	0	0
Tussock Tundra	139 (0.6%)	2	1	14,864 (35.7%)	203	80	5,120 (33.4%)	101	83
Dryas Dwarf Shrub Tundra	29 (0.1%)	0	0	104 (0.3%)	1	1	0 (0.0%)	0	0
Cassiope Dwarf Shrub Tundra	0 (0.0%)	0	0	371 (0.9%)	5	2	238 (1.6%)	5	4
Halophytic Willow Dwarf Shrub Tundra	8 (0.0%)	0	0	0 (0.0%)	0	0	0 (0.0%)	0	0
Open and Closed Low Willow Shrub	1,929 (9.0%)	25	7	301 (0.7%)	4	2	1 (0.0%)	0	0
Open and Closed Tall Willow Shrub	0 (0.0%)	0	0	23 (0.1%)	0	0	0 (0.0%)	0	0
Dune Complex	0 (0.0%)	0	0	638 (1.5%)	9	3	113 (0.7%)	2	2
Partially Vegetated	1,183 (5.5%)	15	4	334 (0.8%)	5	2	130 (0.8%)	3	2
Barrens	4,487 (20.8%)	58	17	838 (2.0%)	11	5	311 (2.0%)	6	5
Totals	21,536 (100.0%)	279	80	41,692 (100.0%)	569	224	15,312 (100.0%)	303	249

Notes: The proportion of vegetation types within the hypothetical circles in each facility group area and the approximate acres of vegetation disturbed by gravel fill and dust were used to distribute the number of acres affected across vegetation types (assuming the vegetation types in the hypothetical circles are the distribution of habitats to be affected by the FFD Alternative B scenario).

Colville River Delta Facility Group

Gravel Pads, Roads, and Airstrips

In addition to habitat loss described under CPAI Development Plan Alternative B, there would be additional vegetation loss in the Colville River Delta Facility Group from future production pads such as hypothetical production pads CD-11, CD-12, CD-14, CD-15, CD-19, CD-20, and CD-21 and their associated roads, pads, and airstrips. The dominant vegetation class in the vicinity of Colville River Delta is Wet Sedge Meadow Tundra. Under the Alternative B FFD scenario, approximately 279 acres of vegetation would be covered with gravel fill for the construction of well pads, connecting roads, and airstrips in the Colville River Delta Facility Group. The types of disturbances and impacts to vegetation associated with gravel fill placement would be the same as those described previously for CPAI Development Plan Alternative A.

Gravel extraction for the hypothetical FFD would result in the destruction of some vegetation. Specific gravel sources for the hypothetical FFD scenario have not been identified. The development process of any future gravel source would include planning, design, permitting, temporary staging areas, removal of overburden, blasting and excavation of gravel, and an approved rehabilitation plan. Analysis of impacts and appropriate mitigation measures would be examined before approval of future mine sites.

Dust Fallout from Roads

Impacts from dust under FFD Alternative B would be similar in type to those described for CPAI Development Plan Alternative A. These impacts would be felt over about 80 acres in the Colville River Delta Facility Group.

Ice Roads, Ice Pads, and Snow Stockpiles

Under Alternative B for FFD in the Colville River Delta Facility Group, approximately 143 miles of ice roads would be constructed during the construction period and over the life of the project, affecting approximately 693 acres of vegetation. The maximum area covered by ice roads in a single year would be 165 acres, with an average of 116 acres per year. As with CPAI Development Plan Alternative B, insulated ice pads would be used as staging areas during pipeline construction, to stockpile overburden material associated with gravel mine sites, for equipment staging areas for bridge installation, and for storage of drill rigs and other equipment at remote production pads. The types of impacts to vegetation associated with ice roads and pads and associated mitigation measures would be the same as those described above for CPAI Development Plan Alternative A.

The types of impacts to vegetation associated with snow stockpiles would be the same as those described previously for Alternative A, although the construction of more roads, pads, and airstrips would result in potentially increased impacts to vegetation.

Off-Road Tundra Travel

The types of impacts from off-road tundra travel and associated mitigation measures would be similar to those described under CPAI Development Plan Alternative A. Under FFD Alternative B, the surface area affected would be expected to increase because of the increased length of pipeline and roads and the number of remote facilities that could require off-road tundra travel for emergencies, pipeline maintenance and repair, ice road construction, or supply transport.

Impoundments and Thermokarst

The types of impacts to vegetation associated with thermokarst and ponding and the proposed mitigation measures for these impacts would be the same as those described above for CPAI Development Plan

Alternative A. Under FFD Alternative B, the construction of more roads and pads would result in increased impacts and alteration of vegetation communities from thermokarst and ponding.

Cross-Drainage and Water Flow

Impacts from cross-drainage and water flow would be greatest in the vicinity of the Colville River Delta because of unstable flow regimes and ocean-induced storm surges. In addition, roads would likely cross many ephemeral streams in the Colville River Delta area, and culverts would need to be installed. Culvert placement could potentially disturb sheet flow in the spring and could affect local moisture regimes. Culverts allow surface water flow, but they tend to ice up and increase flow in a small area relative to typical sheet flow.

Air Pollution

No additional processing facilities would be built in the Colville River Delta Facility Group under FFD Alternative B; however, the increased amount of vehicles and equipment associated with the production pads and roads would potentially cause a greater increase in air pollution. This increase is not expected to generate levels of pollutants that would affect vegetation.

Pipelines

In addition to the impacts from CPAI Development Plan Alternative B, a total of approximately 0.3 acre of vegetation would be lost to VSM installation under the FFD scenario for Alternative B. The vegetation and habitat types affected would depend on the exact location of the VSM, which would be determined in the field. The types of impacts to vegetation associated with snow drifting or shading from the aboveground pipelines would be the same as those described previously for Alternative A for the ASDP Area.

Power Lines

Under FFD Alternative B, power lines would be placed on cable trays on pipeline VSMs and would not cause any additional disturbance to vegetation.

Fish-Judy Creeks Facility Group

In addition to habitat loss described under CPAI Development Plan Alternative B, there would be additional vegetation loss in the Fish-Judy Creeks Facility Group for the construction of a processing facility; well pads CD-8, CD-10, CD-13, CD-16, CD-17, CD-18, CD-22, CD-23, CD-24, and CD-26; and their associated roads and airstrips. Dominant vegetation classes in the Fish-Judy Creeks area are *Dryas* Tundra and Wet Sedge Meadow Tundra. (Table 4A.3.1-3). Under the FFD scenario, approximately 569 acres of vegetation would be covered with gravel fill in the Fish-Judy Creeks Facility Group (Table 4A.3.1-1). The types of disturbances and impacts to vegetation associated with gravel fill placement would be the same as those described previously for CPAI Development Plan Alternative A.

Dust Fallout from Roads

In the Fish-Judy Creeks Facility Group, potential impacts from dust would disturb about 224 acres of vegetation. The types of impacts to vegetation and mitigation measures associated with dust fallout would be the same as those described previously for CPAI Development Plan Alternative A.

Ice Roads, Ice Pads, and Snow Stockpiles

Under Alternative B for FFD in the Fish-Judy Creeks Facility Group, approximately 196 miles of ice roads would be constructed during construction and over the life of the project, affecting about 950 acres of vegetation. The maximum area covered by ice roads in a single year would be 184 acres, with an average of

97 acres per year. The types of impacts to vegetation associated with ice roads and snow stockpiles would be the same as those described previously for CPAI Development Plan Alternative A, although the construction of more roads, pads, and airstrips would result in potentially increased impacts to vegetation.

Off-Road Tundra Travel

The types of impacts from off-road tundra travel and associated mitigation measures would be similar to those described for CPAI Development Plan Alternative A. Under FFD Alternative B, the surface area affected would be expected to increase because of the increased length of pipeline, roads, and number of remote facilities that could require off-road tundra travel for emergencies, pipeline maintenance and repair, ice road construction, or supply transport.

Impoundments and Thermokarst

The types of impacts to vegetation associated with thermokarst and ponding and the proposed mitigation measures for these impacts would be the same as those described previously for CPAI Development Plan Alternative A. The construction of more roads and pads could potentially result in increased impacts and alteration of vegetation communities from thermokarst and ponding.

Cross-Drainage and Water Flow

The types of impacts to vegetation associated with cross-drainage and water flow would be the same as those described previously for CPAI Development Plan Alternative A, although the construction of more roads and culverts could potentially cause increased impacts to vegetation communities from disturbance of local water flow.

Air Pollution

The construction of an additional processing facility would result in increased levels of air pollution that could affect vegetation in the vicinity of Fish and Judy creeks, as described in CPAI Development Plan Alternative A.

Pipelines

In the FFD scenario for Alternative B, approximately 0.8 acre of vegetation would be lost in the vicinity of Fish and Judy creeks by VSM placement.

Power Lines

Under FFD Alternative B, power lines would be placed on cable trays on pipeline VSMs and would not cause any additional disturbance to vegetation.

Kalikpik-Kogru Rivers Facility Group

In addition to habitat loss described for CPAI Development Plan Alternative B, approximately 303 acres of vegetation would be affected in the Kalikpik-Kogru Rivers Facility Group for the construction of a hypothetical processing facility; production pads CD-25, CD-27, and CD-28; and their associated roads and airstrips. The dominant vegetation classes in the Kalikpik-Kogru Rivers Facility Group are Tussock Tundra and Sedge/Grass Meadow (BLM and DU 2002) (Table 4A.3.1-1). The types of disturbances and impacts to vegetation associated with gravel fill placement would be the same as those described previously for CPAI Development Plan Alternative A.

Dust Fallout from Roads

In the Kalikpik-Kogru rivers area, potential impacts from dust could result in about 249 acres of vegetation disturbed. The types of impacts to vegetation and mitigation measures associated with dust fallout would be the same as those described previously for CPAI Development Plan Alternative A.

Ice Roads, Ice Pads, and Snow Stockpiles

Under Alternative B for FFD in the Kalikpik-Kogru Rivers Facility Group, approximately 144 miles of ice roads would be constructed during construction and over the life of the project, affecting about 698 acres of vegetation. The maximum area covered by ice roads in a single year would be 242 acres, with an average of 175 acres per year. The types of impacts to vegetation associated with ice roads and snow stockpiles would be the same as those described previously for CPAI Development Plan Alternative A, although the construction of more roads, pads, and airstrips would result in potentially increased impacts to vegetation.

Tundra Travel

The types of impacts from off-road tundra travel and associated mitigation measures would be similar to those described for CPAI Development Plan Alternative A. Under FFD Alternative B, the surface area affected would be expected to increase because of the increased length of pipeline, roads, and number of remote facilities that may require off-road tundra travel for emergencies, pipeline maintenance and repair, ice road construction, or supply transport.

Impoundments and Thermokarst

The types of impacts to vegetation associated with thermokarst and ponding and the proposed mitigation measures for these impacts would be the same as those described previously for CPAI Development Plan Alternative A. Under FFD Alternative B, the construction of more roads and pads would result in increased impacts and alteration of vegetation communities from thermokarst and ponding.

Cross-Drainage and Water Flow

The types of impacts to vegetation associated with cross-drainage and water flow would be the same as those described previously for CPAI Development Plan Alternative A, although the construction of more roads and culverts under FFD Alternative B would cause increased impacts to vegetation communities from disturbance of local water flow.

Air Pollution

The construction of an additional processing facility in the Kalikpik-Kogru area would result in increased levels of air pollution that could impact vegetation, as described in CPAI Development Plan Alternative A.

Pipelines

In the FFD scenario for Alternative B, approximately 0.3 acre of vegetation would be lost in the Kalikpik-Kogru Rivers Facility Group from VSM placement. The types of impacts to vegetation associated with snowdrifting or shading from pipeline placement would be the same as those described above under Alternative A for the ASDP Area.

Power Lines

Under FFD Alternative B, power lines would be placed on cable trays on pipeline VSMs and would not cause any additional disturbance to vegetation.

4B.3.2.3 Alternative B – Summary of Impacts (CPAI and FFD) on Terrestrial Vegetation and Wetlands

Impacts from CPAI Development Alternatives A through D to vegetation and habitat types are summarized in Tables 4A.3.1-1 and 4A.3.1-2, respectively. Impacts from FFD Alternative A are summarized in Table 4B.3.1-3.

4B.3.2.4 Alternative B – Potential Mitigation Measures (CPAI and FFD) for Terrestrial Vegetation and Wetlands

Potential mitigation measures would be the same as those identified for Alternative A (Section 4A.3.1.3).

4B.3.3 Fish

As in Alternative A, the primary concern in the Plan Area is maintaining winter habitat for fish. Maintaining suitable feeding and spawning areas and access to these areas, which are often in different geographic locations; water withdrawal; alteration of flow patterns; release of contaminants during the life of the project; and the impacts of oil spills are likewise of concern.

Impacts of and measures to prevent, control, and mitigate spills are addressed in Section 4.3. Further, that section includes an assessment of the effects of the project on marine fish and habitats. Normal construction and operation impacts for this alternative would not be expected to have measurable effects on Harrison Bay and nearshore Beaufort Sea environments and biota. Essential Fish Habitat is discussed in Section 4C.3.2.

4B.3.3.1 Alternative B – CPAI Development Plan Impacts on Fish

The CPAI Development Plan Alternative B (Figure 2.4.2.1-1) differs from Alternative A in that the project is designed to attain complete conformance with Northeast NPR-A IAP/EIS stipulations as presented in the 1998 ROD (BLM and MMS 1998b). The primary differences include (1) moving the location of production pad CD-6 and the associated pipeline outside the 3-mile sensitive area surrounding Fish Creek (as designated by BLM and MMS 1998a); (2) eliminating the Nigliq Channel Road Bridge; (3) eliminating the entire road between CD-2 and CD-6; and (4) constructing airstrips at production pads CD-5 and CD-6.

The impacts of Alternative B are largely the same as those of Alternative A discussed in Section 4A.3.2.1. Major differences from Alternative A are addressed in the following text.

Construction Period

The construction of Alternative B would not result in any significant obstructions to fish movements. Fish would not be present in the affected areas during winter.

Water Withdrawal

The main potential impacts of Alternative B would be related to winter water withdrawal from fish-bearing lakes, as described in Section 4A.3.2. Impacts are not expected if withdrawals are conducted in compliance with permit requirements. The necessary water withdrawals would be monitored to ensure that the volume of water removed from any lake does not exceed permitted amounts. Potential water sources (for example, for ice roads) would be the same lakes as described under Alternative A (see Figures 4A.3.2-1 and 4B.3.2-1).

Gravel Mining

Impacts of gravel mining are as described in Section 4A.3.2, although they could be reduced compared to Alternative A because of a reduced need for gravel under this alternative.

Pipelines

Impacts of pipeline installation would be generally the same as those for Alternative A (Section 4A.3.2). A pipeline crossing of or a pipeline bridge over the Nigliq Channel would be required. A pipeline-only bridge would carry a significantly smaller load, enabling a span of much greater distance as compared to a road bridge.

Pads and Airstrips

The airstrip at CD-5 would be built on higher ground near the production pad and does not appear to impinge on any lakes or wetlands potentially used by fish (see Figure 2.4.1.1-4 for detail near CD-5).

Likewise, the production pad and airstrip at CD-6 would be situated on high ground and would not impinge on any fish habitat. The location of this pad and airstrip outside of the sensitive area surrounding Fish Creek would eliminate the possibility of impacts to that sensitive habitat.

In Alternative B, the road and pipeline corridors to CD-7 are somewhat shorter than the corresponding features of Alternative A and are outside the sensitive habitat around Fish Creek. No winter fish habitat would be affected, nor would any instream channel work be required.

Bridges and Roads

Impacts of road construction would be similar to those of Alternative A (Section 4A.3.2), but they would affect a much smaller area.

There would be a 40-foot bridge over the narrow neck of Lake 9323 just north of CD-4. This would eliminate potential impacts of culvert installation described in Section 4A.3.2.

The Nigliq Channel road bridge would not be constructed. A favorable consequence relative to Alternative A is that the need for midstream support piers would be eliminated along with the potential construction impacts to the Nigliq Channel as described in Section 4A.3.2.

Similarly, no road bridge would be needed at the Ublutuooh River, and no impacts from pipeline construction would be expected at this site.

The road and bridges from CD-2 to CD-5 and from CD-5 to CD-6 would not be constructed, and the associated impacts as described in Section 4A.3.2 would not occur. CPAI would still build ice roads for winter construction of the pipeline from CD-2 to CD-6.

Road bridges would still be required just north of CD-4 and east of CD-7, as in Alternative A (Section 4A.3.2).

Culverts

No culverts have been proposed for Alternative B. Impacts of culverts, if installed, would be as described in Section 4A.3.2.

Boat Ramps and Docks

Construction of boat ramps and docks, should any be needed for spill response purposes, may have instream impacts similar to those of bridge construction.

Power Lines

Wherever there are roads, power lines would be buried in or under roads or at the toe of the road slope. There should be no incremental impacts to fish beyond those described for roads (Section 4A.3.2).

Where there are no roads, power lines would be buried in the tundra adjacent to the pipeline. They would be hung off pipeline bridges at stream crossings and trenched across minor drainages. Because trenching would occur in winter when these waters would be frozen and no fish would be present, no impacts to fish would be expected

Operation Period

Roads and Pipelines

Operation of the pipeline in Alternative B would have effects similar to those described in Section 4A.3.2. Impacts from low-ground-pressure vehicles needing emergency access in roadless areas when the ground is not frozen could potentially occur between CD-2 and CD-3 and between CD-2 and CD-6.

The pipeline corridor would have minimal effects on fish habitat. No in-channel structures are contemplated. In particular, the VSMs on which the pipeline over the Nigliq Channel would be mounted would not result in alteration or loss of habitat nor obstruction of fish passage.

Pads, Roads, and Airstrips

Operation of airstrips, production pads, and the roads in Alternative B would have impacts similar to those of Alternative A (Section 4A.3.2); however, they would be on a smaller scale because of the shorter length of roads proposed for Alternative B. Because of the shorter length of roads proposed for Alternative B, the potential for flow alteration on a landscape scale would be smaller relative to Alternative A.

Production pad CD-6 is reasonably close to but upstream of Lake M9925. This tundra lake is about 4 feet deep and has been documented to contain ninespine sticklebacks during summer. In Alternative B, CD-6 is located outside the sensitive area as designated by BLM and MMS (1998a) in the Fish Creek drainage and farther away from Fish Creek—a very important fish habitat. This should reduce the potential for contaminants to reach this important habitat.

Bridges

Operation of the two proposed 40-foot bridges would not be expected to have any effects on fish. Because the Nigliq Channel road bridge would not be built, the potential for the disruptive effects of gravel road approaches to the bridge would be eliminated.

Culverts

Culverts, should they be installed, would be designed to maintain adequate water flow and fish passage. The nature of the potential impacts of installed culverts would be as described in Section 4A.3.2. Because of the shorter length of roads proposed for Alternative B, there potentially would be fewer culverts, and thus a lower impact potential, than in Alternative A.

Human Access

Issues associated with and impacts of human access would be generally as described for Alternative A (Section 4A.3.2). The presence of ice roads during winter might encourage local fisherman to fish the Ublutuooh fish overwintering area. This could result in a more than negligible increase of fishing pressure on overwintering fishes.

4B.3.3.2 Alternative B – Full-Field Development Impacts on Fish

Types of impacts of future development in the Plan Area generally will be similar to those described above for the five-pad CPAI Development Plan Alternative B (Section 4A.3.2). However, development on the scale

postulated will, depending on precise siting, destroy or alter fish habitat substantially more than CPAI's proposed project. Overwintering, rearing, migration, and spawning habitats would be affected.

The road and pipeline network would create subtle alteration of flows of waterways on a landscape scale that could lead to unexpected shifts in drainage and loss of fish resources. Overall, the extent of roads has been substantially reduced from Alternative A, thus the extent of impacts would be proportionally reduced. Impacts to fish passage would be minimized by installation of culverts or bridges as determined during future permitting efforts. However, failure of any culverts that might be installed (Section 4A.3.2) could cause widespread habitat alteration and obstruction of fish movement.

The extent of road development under this scenario suggests that there should be increased potential for human access to fish resources throughout the ASDP Area, thus creating greater pressure on fish populations. However, road access would be allowed for industry only, and no gravel roads would cross the Fish and Judy creek drainages between APF-2 and CD-25. Conversely, some traditional users of the area may chose other locations to avoid industrial activity altogether.

State-of-the-science construction and operation approaches would be used to minimize impacts, and human access to resources could be controlled as described in Section 4A.3.2. Withdrawal of fresh water necessary to support this scale of infrastructure development plus well drilling should not affect fish if withdrawals are done in compliance with permit restrictions. The cumulative effects of this FFD scenario are expected to be similar to effects from current developments. Future mitigation measures are expected to be successful, based on the impacts of previous projects to fish habitat and passage.

The following subsections summarize concerns specific to the three facility groups.

Colville River Delta Facility Group

In the Colville River Delta, seven new production pads are hypothesized. Of particular note are production pads CD-19 and CD-21 on the eastern side of the outer Colville River Delta, which are in vicinity of the commercial (Helmericks) fishery as well as subsistence fisheries. Spills, addressed in Section 4.3, would be of major concern with these two hypothetical facilities.

No roads are hypothesized in this part of the Plan Area except short pad-airstrip roads and the road from CD-4 to CD-11. Pipelines would be constructed over several major watercourses including the Elaktoveach Channel, Kupiguak Channel, Tamayayak Channel, and the main stem of the Colville River. Instream construction activities at these water bodies would have the potential to cause impacts as described in 4A.3.3.1.

Fish-Judy Creeks Facility Group

Ten new pads and one new processing facility in the Fish Creek watershed (including Judy Creek and the Ublutuocho River) are hypothesized.

CD-8 and APF-2 have been moved out of the area around the Fish and Judy creek drainages designated for no permanent oil and gas facilities by BLM and MMS (1998a). Thus, the potential impacts to these sensitive habitats would be reduced relative to Alternative A FFD. CD-18 would be in the sensitive area near the Colville River, as designated by BLM and MMS (1998a), and would require consultation. CD-23, CD-24, and APF-2 would be in the sensitive area around the Fish and Judy creek drainages, as designated by BLM and MMS (1998a), and would require consultation.

The road network of this hypothetical development is less extensive than that of Alternative A. If roads are not routed along high ground to the extent possible, relatively large areas of fish habitat could be affected during road construction. Roads from CD-7 to CD-25 and from CD-6 to CD-22, which would be perpendicular to the primary drainage flow and thus could dam overland drainage, are not included in this alternative; therefore, the potential landscape-scale disruption of drainage patterns has been largely eliminated in this FFD alternative.

Furthermore, the pipeline crossing the Fish and Judy creek drainages crosses much less (compared with Alternative A) of these sensitive portions of these drainages.

Kalikpik-Kogru Rivers Facility Group

Three new pads and one new processing facility in the Kalikpik-Kogru river drainages are hypothesized.

As with the Fish-Judy Creeks Facility Group, the road network of this hypothetical development is extensive. Therefore, relatively large areas of fish habitat might be affected during road construction if roads are not routed along high ground to the extent possible. The road from CD-25 to APF-3 is perpendicular to the primary drainage flow and thus may function as a dam on a landscape scale, disrupting natural hydrology and obstructing fish movement over a wide area. Bridges or culverts installed in low-lying areas may mitigate this effect. CD-29, near Harrison Bay, has been eliminated; therefore, there would be no direct impacts northeast of CD-28.

4B.3.3.3 Alternative B – Summary of Impacts (CPAI and FFD) on Fish

Within the Plan Area, the primary concerns are generally the same as those arising from Alternative A, namely, impacts to winter habitat, feeding areas, and spawning areas as well as access to those sites.

Water withdrawal for winter construction could create overcrowding and reduce the available pool of dissolved oxygen in a water body, with fish mortality a possible result. Permit limits on amounts of water withdrawn are set to avoid such effects. Low dissolved oxygen may also result from suspension of oxygen-demanding materials during construction of the Nigliq Channel bridge.

Construction of pads, roads, and pipelines is likely to have no measurable adverse effect on arctic fish populations. Construction of ice roads or airstrips on fish overwintering areas could cause freezing to the bottom and block fish movement. The new road system could facilitate increased human access to fishing areas, potentially increasing subsistence fishing pressures. Because the road system of Alternative B would be shorter than that of Alternative A, impacts would be on a smaller scale.

Gravel mining would most likely have direct impacts if situated within the floodplains of rivers. Sedimentation from erosion could affect fish and other aquatic organisms by interfering with respiration and vision and by smothering benthic habitat.

The long network of roads in the FFD scenario could result in alteration of regional surface hydrology, including interruption of fish movements, in the Kalikpik and Kogru river drainages and in the lower Fish Creek drainage.

If culverts are installed, any failures may impound water, thus creating a new pond or lake upstream of the culvert and diminishing flow downstream; in turn, this would interrupt fish movement. Stream morphology changes could occur downstream of culverts as a result of altered flow.

Release of contaminants over the project duration and the impacts of oil spills are important concerns to fish resources; these issues are addressed in Section 4.3.

Essential Fish Habitat

The impacts on EFH for Alternative B are the same as for Alternative A with one major exception: project facilities would be moved outside the 3-mile sensitive area around Fish Creek, thereby reducing the potential for contaminants to affect this salmon stream. The potential impacts from Alternative B to fish in general are described in Section 4B.3.2. Overall, the potential for adverse impacts on salmon EFH exists, particularly from the placement of bridge approaches within river terraces. A finding on EFH will be made following additional project design.

4B.3.3.4 Alternative B – Potential Mitigation Measures (CPAI and FFD) for Fish

1. At project completion, gravel mines should be converted to fish habitat if practicable.
2. Ice roads and airstrips should avoid fish overwintering areas.
3. Silt fencing (or an equivalent measure) should be installed, routinely and frequently inspected, and properly maintained at any sites where silt might enter a water body.

4B.3.4 Birds

4B.3.4.1 Alternative B – CPAI Development Plan Impacts on Birds

Table 4B.3.3-1 presents the potential number of nests displaced as a result of habitat loss or alteration and disturbance for the CPAI Development Plan Alternative B by bird species and species group.

Waterfowl and Loons

Construction Period

Habitat Loss, Alteration, or Enhancement

Impacts to waterfowl and loons related to habitat loss and alteration would be the same as those described previously for Alternative A. The area covered by gravel and lost as potential waterfowl and loon habitat would be reduced in Alternative B from that in Alternative A. Impacts to habitats important to waterfowl and loons would be similar in the Colville River Delta (Table 4B.3.3-2). Impacts to three aquatic and wet habitats important to waterfowl and loons for nesting and brood-rearing would be increased, and impacts to Moist Tussock Tundra nesting habitat would be reduced in the NPR-A area. Impacts to waterfowl and loon habitat from dust would be reduced by the elimination of roadways in Alternative B. However, impacts from ice roads would be increased during the construction period (Table 4B.3.3-1).

Disturbance and Displacement

Fewer waterfowl and loons would be displaced by vehicle traffic by the reduction in the road system. However, the addition of two airstrips would cause additional disturbance compared to Alternative A (Table 4B.3.3-1).

Obstructions to Movement

Potential obstruction of movement would be reduced in Alternative B compared to Alternative A by the removal of the road between CD-2 and CD-5 to CD-6. The general reduction in gravel fill would result in a reduction in potential obstruction of movements for brood-rearing waterfowl and loons (Table 4B.3.3-2).

Mortality

Mortality resulting from collisions with vehicles would be reduced in Alternative B from that in Alternative A with the reduction in the road system. The addition of two airstrips would increase mortality resulting from collisions with aircraft. Mortality resulting from collisions with power lines on poles would be reduced in Alternative B compared with Alternative A by placement of the power lines on pipeline VSMs between CD-6 and CD-7.

Operation Period

Habitat Loss, Alteration, or Enhancement

Some habitat loss or alteration from snowdrifts, gravel spray, dust fallout, thermokarst, and ponding would continue during project operation. These impacts would be reduced in Alternative B compared with Alternative A because of the reduced amount of gravel fill (Table 4B.3.3-1).

TABLE 4B.3.3-1 CPAI DEVELOPMENT PLAN ALTERNATIVE B – POTENTIAL BIRD NESTS DISPLACED BY HABITAT LOSS OR ALTERATION AND DISTURBANCE

Species	Nests Loss from Gravel Placement						Habitat Alteration		Disturbance	
	CD-3	CD-4	CD-5	CD-6	CD-7	Total	Dust	Ice Roads	Airstrip ^a	Total
Waterfowl and Waterbirds										
Greater white-fronted goose	1.7	0.6	0.8	0.2	0.7	4.0	0.6	3.1	11.4	19.0
Snow goose	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Canada goose	0.0	0.0	0.4	0.0	0.2	0.6	0.1	0.8	2.8	4.4
Brant	0.3	0.0	0.2	0.0	0.1	0.6	0.1	0.4	1.5	2.7
Tundra swan	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.6	0.9
Mallard	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Northern shoveler	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.3	0.4
Northern pintail	0.0	0.1	0.0	0.0	0.2	0.5	0.1	0.6	2.2	3.4
Green-winged teal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2
Greater scaup	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2
Lesser scaup	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
King eider	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.2	0.9	1.3
Long-tailed duck	0.2	0.0	0.0	0.1	0.1	0.5	0.1	0.5	1.7	2.7
Waterfowl Total	2.4	0.9	1.6	0.3	1.4	6.6	1.1	5.9	21.6	35.1
Loons										
Red-throated loon	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.4	0.7
Pacific loon	0.1	0.1	0.1	0.0	0.2	0.5	0.1	0.6	2.2	3.4
Yellow-billed loon	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.3	0.4
Loon Total	0.3	0.1	0.2	0.0	0.2	0.7	0.1	0.8	2.8	4.5
Ptarmigan										
Willow ptarmigan	0.1	0.2	0.1	0.1	0.1	0.6	0.1	0.6	2.2	3.5
Rock ptarmigan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ptarmigan Total	0.1	0.2	0.1	0.1	0.1	0.6	0.1	0.6	2.2	3.5
Seabirds										
Parasitic jaeger	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.4
Long-tailed jaeger	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.3	0.5
Glaucous gull	0.1	0.0	0.1	0.0	0.1	0.2	0.0	0.2	0.9	1.4
Sabine's gull	0.1	0.0	0.0	0.0	0.1	0.2	0.0	0.1	0.5	0.8
Arctic tern	0.1	0.1	0.1	0.0	0.1	0.3	0.1	0.3	1.2	1.9

**TABLE 4B.3.3-1 CPAI DEVELOPMENT PLAN ALTERNATIVE B – POTENTIAL BIRD NESTS
DISPLACED BY HABITAT LOSS OR ALTERATION AND DISTURBANCE (cont'd)**

	Nests Loss from Gravel Placement						Habitat Alteration		Disturbance	
Species	CD-3	CD-4	CD-5	CD-6	CD-7	Total	Dust	Ice Roads	Airstrip ^a	Total
Seabird Total	0.3	0.1	0.2	0.0	0.2	0.9	0.2	0.8	3.1	5.0
Shorebirds										
Black-bellied plover	0.3	0.2	0.1	0.0	0.5	1.2	0.4	2.0	0.0	3.5
American golden-plover	0.4	0.3	0.3	0.6	0.3	1.8	0.3	1.4	0.0	3.5
Bar-tailed godwit	0.1	0.1	0.1	0.3	0.1	0.7	0.1	0.5	0.0	1.3
Semipalmated sandpiper	3.3	2.8	1.3	0.6	2.5	10.5	2.5	12.9	0.0	25.8
Baird's sandpiper	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2
Pectoral sandpiper	6.3	5.4	2.3	1.5	2.8	18.2	3.5	17.4	0.0	39.0
Dunlin	0.2	0.2	0.3	0.3	0.3	1.3	0.3	1.5	0.0	3.1
Stilt sandpiper	0.3	0.2	1.0	0.0	0.4	1.9	0.3	1.7	0.0	3.9
Buff-breasted sandpiper	0.0		0.0	0.0	0.3	0.3	0.1	0.8	0.0	1.2
Long-billed dowitcher	0.5	0.4	1.1	0.6	1.3	4.0	0.9	4.8	0.0	9.6
Red-necked phalarope	1.6	1.3	1.1	0.9	1.9	6.8	1.3	6.9	0.0	15.1
Red phalarope	1.1	0.9	0.7	0.0	0.5	3.2	0.6	3.3	0.0	7.2
Shorebird Total	13.9	11.9	8.4	4.6	11.0	49.8	10.3	53.3	0.0	113.4
Passerines										
Yellow wagtail	0.1	0.1	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.5
Savannah sparrow	0.4	0.3	0.0	0.0	0.4	1.1	0.3	1.4	0.0	2.8
Lapland longspur	6.3	5.4	2.7	2.9	5.2	22.6	4.7	24.7	0.0	52.0
Common redpoll	0.1	0.1	0.0	0.3	0.2	0.6	0.1	0.7	0.0	1.4
Passerine Total	6.8	5.8	2.7	3.2	5.8	24.4	5.2	27.1	0.0	56.6

Notes:

^a Disturbance at airstrips would potentially reduce nesting by 50% within 500 meters of airstrip for waterfowl, loons, and seabirds. No disturbance was evident for shorebirds and passerines (Johnson et al. 2003a).

TABLE 4B.3.3-2 ALTERNATIVE B – SUMMARY OF AFFECTED HABITAT TYPES USED BY WATERFOWL AND LOONS^a

Habitat Type	Colville River Delta						NPR-A					
	Acres in Colville River Delta ^b	Loss or Alteration ^c (Acres and %)		Waterfowl (10 species)			Acres in NPR-A ^d	Loss or Alteration ^c (Acres and %)		Waterfowl (9 species)		
				Nesting (10)	Brood-rearing (10)	Staging (3)				Nesting	Brood-rearing (6)	Staging (1)
Open Nearshore Water	2,476					1	840					
Brackish Water	1,614			2	6	2	331					
Tapped Lake with Low-water Connection	5,342				3	1	420					
Tapped Lake with High-water Connection	5,132	12	(0.2%)	1	4		17					
Salt Marsh	4,090			1	1	1	902					
Tidal Flat	13,841					1	2,021					
Salt-killed Tundra	6,336			5		1	35					
Deep Open Water without Islands	5,132			2	7		1,2343				5	1
Deep Open Water with Islands or Polygonized Margins	191,756	8	(0.0%)	5	6	1	8,950			3	3	1
Shallow Open Water without Islands	499				1		1,737	3	(0.2%)	1		
Shallow Open Water with Island or Polygonized Margins	133			1	2		2,824	3	(0.1%)	4	1	
River or Stream	20,280					1	1,525					
Aquatic Sedge Marsh	32						2,854	9	(0.3%)	3	2	
Aquatic Sedge with Deep Polygons	3,267	8	(0.2%)	8	3		74					
Aquatic Grass Marsh	358	9	(2.4%)		1		487			1	1	
Young Basin Wetland Complex							623	7	(1.2%)			
Old Basin Wetland Complex	2						15,118	11	(0.1%)	2	1	1
Riverine Complex							687					
Dune Complex							1,876					
Nonpatterned Wet Meadow	10,265	17	(0.2%)	4			5,305	15	(0.3%)	1	1	
Patterned Wet Meadow	25,361	40	(0.2%)	8			19,487	21	(0.1%)			1
Moist Sedge-Shrub Meadow	3,262	18	(0.6%)	2			39,920	76	(0.2%)	1		1
Moist Tussock Tundra	630						47,101	61	(0.1%)	3		
Riverine Low and Tall Shrub				1			1,794					
Upland Low and Tall Shrub							692					
Upland and Riverine Dwarf Shrub ^b							2,217					
Riverine or Upland Shrub ^c	6,815	1	(0.0%)				0					

TABLE 4B.3.3-2 ALTERNATIVE B – SUMMARY OF AFFECTED HABITAT TYPES USED BY WATERFOWL AND LOONS^a (cont'd)

Habitat Type	Colville River Delta						NPR-A					
	Acres in Colville River Delta ^b	Loss or Alteration ^c (Acres and %)		Waterfowl (10 species)			Acres in NPR-A ^d	Loss or Alteration ^c (Acres and %)		Waterfowl (9 species)		
				Nesting (10)	Brood-rearing (10)	Staging (3)				Nesting	Brood-rearing (6)	Staging (1)
Barrens (riverine, eolian, or lacustrine)	19,440	4	(0.0%)				1,690					
Artificial (water, fill, peat road)	96						0					
Total Area	136,323	118	(0.1%)				171,869	206	(0.1%)			

Notes:

^a Numbers of species using habitats by life history stage

^b Mapped for NPR-A area only

^c Total includes gravel for pads and airstrips and area affected by dust

^d Mapped for Colville River Delta area only

Disturbance and Displacement

Under Alternative B, loons and waterfowl would be subjected to the same types of disturbances discussed previously for Alternative A, including disturbances related to vehicular and air traffic. Disturbances to waterfowl and loons by vehicle traffic would be reduced in Alternative B from Alternative A by the reduction in the road system. Disturbance related to air traffic would be increased for waterfowl and loons by the addition of airstrips at CD-5 and CD-6 (Table 4B.3.3-1).

Obstructions to Movement

Potential obstructions to waterfowl and loon movements related to the presence of gravel roads would be reduced in Alternative B compared to Alternative A by the reduction in the road system and the general reduction in gravel fill between alternatives (Table 4B.3.3-2).

Mortality

Potential mortality from collisions with vehicles would be reduced in Alternative B from Alternative A by the reduction in the road system. Potential mortality from collisions with aircraft would be increased in Alternative B compared to Alternative A by the addition of airstrips at CD-5 and CD-6.

Ptarmigan

Construction Period

Habitat Loss, Alteration, and Enhancement

The area covered by gravel and lost as potential ptarmigan habitat would be reduced in Alternative B from Alternative A (Table 4B.3.3-2). Impacts to ptarmigan habitat from dust would be reduced by the elimination of roadways in Alternative B compared to Alternative A. However, impacts from ice roads would be increased during the construction period (Table 4B.3.3-1).

Disturbance and Displacement

Some ptarmigan might remain on the Arctic Coastal Plain during winter, and a few birds could be disturbed or displaced during construction. In Alternative B, any potential for disturbance would be reduced compared to Alternative A because of the reduction in gravel placement for the road system. Disturbance from aircraft traffic would be increased in Alternative B compared to Alternative A by the addition of airstrips at CD-5 and CD-6 (Table 4B.3.3-1).

Obstructions to Movement

Movements of ptarmigan are unlikely to be affected by gravel placement for roads, well pads, and airstrips because ptarmigan can fly over or around such structures. Ptarmigan may use some structures, such as pipelines, for perches.

Mortality

Ptarmigan could suffer mortality from collisions with vehicular traffic, machinery, buildings, bridges, and pipelines during the construction phase of the development. Ptarmigan were among the species of birds most often struck by traffic in association with the TAPS project, although the number of birds lost was likely low compared to area populations (TAPS Owners 2001). Under Alternative B the potential for ptarmigan mortality from collisions with vehicular traffic would likely be reduced compared to Alternative A because of the reduction in the road system for this alternative. Ptarmigan are not likely to collide with aircraft, and mortality would not be increased by the addition of airstrips at CD-5 and CD-6.

Operation Period

Habitat Loss, Alteration, and Enhancement

Some habitat loss and alteration would continue from dust deposition, snowdrifts, thermokarst, and ponding during project operations. Construction of annual ice roads during drilling would continue to alter ptarmigan winter and nesting habitat during project operation.

Disturbance and Displacement

Disturbance and displacement of ptarmigan in the CD-3 and CD-4 areas under Alternative B would be the same as that describe for Alternative A. At the NPR-A sites, overall disturbance would likely be reduced under Alternative B compared to Alternative A because of a reduction in the road system. Disturbance could increase in the immediate area of the CD-5 and CD- 6 airstrips (Table 4B.3.3-1). Potential disturbance at the CD-7 site would be the same as that described under Alternative A.

Obstructions to Movement

Potential obstruction to movements of ptarmigan under Alternative B would be reduced compared to Alternative A because of the reduced road system under Alternative B. Obstruction to movements would be expected to be minimal because of the ability of ptarmigan to easily move over or around infrastructure.

Mortality

Under Alternative B the potential for collisions of ptarmigan with vehicular traffic would be reduced compared to Alternative A during the summer because of a reduction in the road system. As under Alternative A, increased levels of depredation from predators attracted to developed areas could increase adult, egg, and chick mortality of ptarmigan. Potential mortality caused by avian predators would be reduced in Alternative B

compared to Alternative A by reduction in available perching habitat for predators by placement of power lines on VSMs between CD-6 and CD-7.

Raptors and Owls

Habitat loss and disturbance resulting from the proposed development under Alternative B are unlikely to affect raptors and owls because of the low numbers of those birds reported in the Plan Area. Raptors may use structures as perches. Perches would be reduced in Alternative B compared to Alternative A because power lines would be placed on VSMs instead of poles between CD-6 and CD-7. Gravel roads, buildings, pipelines, and bridges are unlikely to obstruct movements of raptors and owls. The small number of raptors and owls in the Plan Area could suffer mortality from collisions with vehicles, aircraft, buildings, bridges, pipelines, or power lines.

Shorebirds

Construction Period

Habitat Loss, Alteration, or Enhancement

Habitat loss and alteration resulting from gravel placement would be reduced in Alternative B compared to Alternative A (Table 4B.3.3-2). The proportion of available Moist Tussock Tundra and Patterned Wet Meadow habitats filled by gravel would be reduced in Alternative B compared to Alternative A, although both alternatives would affect a very small proportion of the available habitat (Table 4B.3.3-2). Habitat alteration resulting from ice roads would be increased in Alternative B compared to Alternative A (Table 4B.3.3-1). Temporary habitat loss and permanent habitat alteration from the removal of gravel from the ASRC Mine Site and Clover Potential Gravel Source would be reduced under Alternative B compared to Alternative A because of the reduction in total gravel fill.

Disturbance and Displacement

Impacts to shorebirds from human activities during summer construction activities at production pads would be similar for Alternative B to those described for Alternative A. Impacts at CD-3, CD-4, and CD-7 would be the same. Disturbance from vehicle traffic from CD-2 to CD-5, and CD-5 to CD-6 would be eliminated. Noise-related impacts associated with aircraft would be increased at CD-5 and CD-6, although no disturbance pattern was found for shorebirds at the Alpine Development (Johnson et al. 2003a).

Obstructions to Movements

Potential obstructions to movements of shorebird broods by roadways would be reduced in Alternative B compared to Alternative A because of the removal of the roads connecting CD-2 to CD-6.

Mortality

Potential mortality from collisions with vehicles would be decreased in Alternative B compared to Alternative A by the reduction in the road system. Potential mortality of adults, nests, and juveniles from depredation would be decreased in Alternative B compared to Alternative A because power lines would be placed on VSMs instead of on poles.

Operation Period

Habitat Loss, Alteration, or Enhancement

Habitat loss and alteration resulting from dust fallout and ice roads would continue during project operations. Habitat alteration from dust fallout would be reduced in Alternative B compared to Alternative A because of the reduction in the road system, while habitat alteration resulting from ice road construction during drilling would be increased in Alternative B compared to Alternative A (Table 4B3.3-1).

Disturbance and Displacement

Disturbance resulting from vehicle traffic would be reduced in Alternative B compared to Alternative A because of the reduction in the road system. Disturbance by aircraft would be increased by the addition of airstrips at CD-5 and CD-6, although disturbance was not found to affect nesting density of shorebirds at Alpine (Johnson et al. 2003a).

Obstructions to Movements

Obstructions to movements of brood-rearing shorebirds would be reduced in Alternative B compared to Alternative A by the reduction in the road system.

Mortality

Potential mortality from collisions with vehicles would be reduced in Alternative B compared to Alternative A, because of the reduction in the road system. Potential mortality from collisions with aircraft would not be expected. Potential mortality from depredation by avian predators would be reduced in Alternative B compared to Alternative A by placement of power lines on VSMs instead of poles, eliminating power lines as potential perching habitat for avian predators.

Seabirds (Gulls, Jaegers, and Terns)

Construction Period

Habitat Loss, Alteration, and Enhancement

Less area would be covered by gravel and lost as potential seabird habitat in Alternative B than in Alternative A. Impacts to habitats important to seabirds would be similar in the Colville River Delta (Table 4B.3.3-2). Impacts to three aquatic and wet habitats important to seabirds, especially gulls, for nesting and brood-rearing would be increased in the NPR-A area (Table 4B.3.3-1). Impacts to seabird habitat from dust would be reduced by the elimination of roadways between CD-2 and CD-6 in Alternative B. However, impacts from ice roads would be increased during the construction period (Table 4B.3.3-1).

Disturbance and Displacement

Disturbance by vehicle traffic would be reduced as a result of the reduction in the road system in Alternative B compared to Alternative A. Disturbance from air traffic would be increased in Alternative B compared to Alternative A by the addition of airstrips at CD-5 and CD-6 (Table 4B.3.3-1).

Obstructions to Movement

Potential obstruction of movements of seabird brood would be reduced by the elimination of the roads between CD-2 and CD-5.

Mortality

Potential seabird mortality resulting from collisions with vehicles would be reduced in Alternative B compared to Alternative A by the reduction in the road system. Potential mortality from collisions with aircraft compared to Alternative A would increase with the addition of airstrips at CD-5 and CD-6 in Alternative B. Gulls in particular are vulnerable to mortality caused by collisions with both vehicles and aircraft.

Operation Period

Habitat Loss, Alteration, and Enhancement

Habitat loss and alteration would continue during project operation as a result of gravel spray, dust fallout, and ice road construction in support of drilling operations. Habitat alteration caused by dust fallout would be reduced in Alternative B compared to Alternative A by the reduction in the road system. Habitat alteration would be increased in Alternative B compared to Alternative A because of more ice-road construction to support drilling activities.

Disturbance and Displacement

Disturbance caused by vehicle traffic along roadways would be reduced in Alternative B compared to Alternative A by the reduction in the road system. Disturbance from air traffic would be increased in Alternative B compared to Alternative A by the addition of airstrips at CD-5 and CD-6 (Table 4B.3.3-1). In addition, potential hazing of seabirds from the area surrounding the additional airstrips would increase disturbance to seabirds.

Obstructions to Movement

Potential obstructions to movements of seabird broods would be reduced in Alternative B compared to Alternative A because of the reduction in the road system.

Mortality

Under Alternative B, the potential for seabird mortality resulting from collisions with vehicular traffic or bridges would be reduced compared to Alternative A because of the reduction in the road system. Potential seabird mortality caused by collisions with aircraft would be increased by the addition of airstrips at CD-5 and CD-6.

Passerines

Construction Period

Habitat Loss, Alteration, or Enhancement

Gravel fill at CD-3 and CD-4 would be the same for Alternative B as for Alternative A. Habitat loss and alteration at these locations would be the same for passerines in both of these alternatives. Habitat loss and alteration from dust fallout would be reduced in Alternative B compared to Alternative A because there would be less gravel fill in Alternative B (Table 4B.3.3-1). Temporary habitat loss and permanent habitat alteration from the removal of gravel from the ASRC Mine Site and Clover Potential Gravel Source would be reduced in Alternative B compared to Alternative A by the reduction in the total amount of gravel used for construction. Elimination of the bridges across the Nigliq Channel and the Ublutuoch River would reduce the impact to shrub habitats used by nesting passerines (Table 4B.3.3-2), although these habitats would be temporarily altered by ice bridges. Habitat enhancement for ravens and snow buntings would be similar for Alternatives B

and A, because buildings would be the same for these alternatives. Perching habitat would be reduced for ravens in Alternative B compared to Alternative A by placement of power lines on VSMs instead of poles.

Disturbance and Displacement

Disturbance from vehicle traffic would be reduced in Alternative B compared to Alternative A by the reduction in the road system. Disturbance from air traffic would be increased by the airstrips at CD-5 and CD-6, although the Alpine Development airstrip was not found to cause disturbance-related reduction in nesting of passerines (Johnson et al. 2003a).

Obstructions to Movements

No obstruction to movements of passerines is expected from construction of the project.

Mortality

Potential mortality caused by collisions with vehicles is reduced in Alternative B compared to Alternative A by the reduction in the road system. No mortality from collisions with aircraft is expected for passerines.

Operation Period

Habitat Loss, Alteration, or Enhancement

Impacts to passerines from habitat loss and alteration would continue during project operation. Ice roads for annual access to CD-5 across riparian habitats and the Nigliq Channel might melt out later during spring and cause additional damage to willow communities used by nesting yellow wagtails, American tree sparrows, common redpolls, and hoary redpolls.

Disturbance and Displacement

Impacts from disturbance by vehicle traffic would be reduced in Alternative B compared to Alternative A because of the reduced road system. Potential disturbance impacts to passerines from air traffic would increase in Alternative B compared to Alternative A because of the airstrips at CD-5 and CD-6, although no difference in nesting densities of passerines was found near the Alpine Development airstrip (Johnson et al. 2003a).

Obstructions to Movements

Operational activities are not anticipated to obstruct movements of passerines.

Mortality

Potential mortality resulting from collisions with vehicles is lower in Alternative B compared to Alternative A because of the reduced road system. Mortality from collisions with aircraft is not expected for passerines and would not be increased by the addition of airstrips at CD-5 and CD-6. Potentially increased depredation by avian predators would be decreased in Alternative B compared to Alternative A by placement of power lines on VSMs instead of poles.

4B.3.4.2 Alternative B – Full-Field Development Plan Impacts on Birds

The mechanisms associated with habitat loss and alteration, disturbance and displacement, obstruction to movements, and mortality for birds in the Colville River Delta, Fish-Judy Creeks, and Kalikpik-Kogru Rivers facility groups would be the same as those described under Alternative A. Table 4B.3.3-3 summarizes potential impacts for Alternative B FFD based on nesting densities in the Colville River Delta and the NPR-A. In Alternative B FFD, all facilities would be moved outside of the 3-mile sensitive area around Fish Creek.

Roads would link many of the production pads in the Fish-Judy Creeks and Kalikpik-Kogru Rivers Facility Groups, although airstrips would be situated at several sites. In the Colville River Delta Facility Group, the proposed facilities for FFD would be the same as those discussed for the Alternative A FFD.

Colville River Delta Facility Group

Table 4B3.3-3 presents a summary of the potential numbers of bird nests affected by the hypothetical FFD in the Colville River Delta based on nesting densities reported for the Delta.

TABLE 4B.3.3-3 SUMMARY OF ALTERNATIVE B FFD IMPACTS TO NESTING BIRDS

Bird Group	Gravel	Dust	Ice Roads	Airstrips ^a	Total
Colville River Delta Facility Group					
Waterfowl	6	1	2	25	34
Loons	1	0	0	4	5
Ptarmigan	1	0	0	3	4
Raptors and Owls	0	0	0	0	0
Seabirds	1	0	0	3	4
Shorebirds ^b	93	13	33	0	139
Passerines ^b	46	7	16	0	69
Total Birds	148	21	51	35	255
Fish-Judy Creeks Facility Group					
Waterfowl	15	6	3	8	32
Loons	2	1	0	1	4
Ptarmigan	1	1	0	1	3
Raptors and Owls	0	0	0	0	0
Seabirds	2	1	0	1	4
Shorebirds ^b	105	40	19	0	164
Passerines ^b	55	21	10	0	86
Total Birds	180	70	32	11	293
Kalikpik-Kogru Rivers Facility Group					
Waterfowl	8	4	5	8	25
Loons	1	0	1	1	3
Ptarmigan	1	0	0	1	2
Raptors and Owls	0	0	0	0	0
Seabirds	1	1	1	1	4
Shorebirds ^b	56	24	32	0	112
Passerines ^b	29	13	17	0	59
Total Birds	96	42	56	11	205

Notes:

^a Disturbance at airstrips would potentially reduce nesting by 50% within 1 km of airstrip (Johnson et al. 2003a).^b No disturbance effects from airstrips have been shown for these groups (Johnson et al., 2003a).**Habitat Loss, Alteration, or Enhancement**

Total habitat loss resulting from gravel placement would be similar in Alternative B FFD to that in Alternative A FFD, resulting in a similar number of potential bird nests affected (Table 4B.3.3-3). Ice roads and dust fallout would also be similar in Alternative B and Alternative A.

Disturbance and Displacement

Potential disturbance and displacement by vehicle traffic at CD-4, CD-11, and CD-12 would be reduced in Alternative B FFD compared to Alternative A FFD by elimination of the road between CD-2 and CD-5 allowing access to the Delta from Nuiqsut. This would reduce potential traffic from the local community to these facilities.

Obstructions to Movements

Obstructions to movements of birds would be decreased in Alternative B FFD compared to Alternative A FFD by the elimination of the road connecting CD-2 to CD-5. All other FFD components of these two alternatives are similar.

Mortality

The reduced road system in Alternative B FFD compared with Alternative A would reduce mortality from collisions with vehicles. Mortality resulting from collisions with aircraft would be the same in Alternative B and Alternative A. Potential mortality from hunting would be lower in Alternative B FFD than in Alternative A FFD if increased access to Nuiqsut by the road between CD-2 and CD-5 contributes to increased harvest.

Fish-Judy Creeks Facility Group

A summary of the potential number of bird nests affected by the hypothetical FFD in the Fish-Judy Creeks Facility Group is presented in Table 4B.3.3-3.

Habitat Loss, Alteration, or Enhancement

Under Alternative B for FFD in the Fish-Judy Creeks Facility Group, the overall amount of habitat loss would be reduced compared to Alternative A because of the reduced road system and the elimination of one production pad. However, the construction of airstrips would increase habitat loss in the immediate areas of CD-6 and CD-24. APF-2 would be moved to an area with lower shorebird nesting density.

Obstructions to Movements

The reduced road system in Alternative B FFD compared with Alternative A FFD would result in less obstruction to movements for brood-rearing birds.

Disturbance and Displacement

The reduction in the road system and reduced access for local traffic would result in less disturbance by vehicle traffic in Alternative B FFD than in Alternative A FFD. Disturbance from air traffic would be increased by the addition of airstrips at CD-5, CD-6, and CD-24.

Mortality

The reduction in the road system and removal of access for local traffic would result in less mortality from collisions with vehicles in Alternative B FFD than in Alternative A FFD. Mortality from collisions with aircraft would be increased by the addition of airstrips at CD-5, CD-6, and CD-24 (Table 4B.3.3-3). Local access to Nuiqsut would be eliminated for Alternative B FFD to pad locations adjacent to the Colville River and Harrison Bay. No increase in subsistence harvest of waterfowl would be expected for Alternative B FFD because of the elimination of local access. The road route between CD-22, CD-10, and CD-8 would cover

more areas often used by molting waterfowl and areas of high nesting density for king eiders, compared to the road route for Alternative A FFD.

Kalikpik-Kogru Rivers Facility Group

A summary of the potential number of bird nests affected by the hypothetical FFD in the Kalikpik-Kogru Rivers Facility Group is presented in Table 4B.3.3-3.

Habitat Loss and Alteration

Habitat loss and alteration are reduced in Alternative B FFD compared to Alternative A FFD by the elimination of the production pad and airstrip at CD-29. The addition of an airstrip at the APF-3 site would increase habitat loss in the immediate area of the facility. Increased ice-road construction because of the elimination of road access would increase temporary habitat alteration during construction and drilling compared with Alternative A FFD.

Disturbance and Displacement

The reduced road system would decrease disturbance resulting from vehicle traffic in Alternative B FFD compared with Alternative A FFD. Disturbance from air traffic would be similar in Alternative B FFD and Alternative A FFD, although fewer birds may be affected by the airstrip at APF-3 compared to the airstrip at CD-29 in Alternative A FFD. The relocation of the airstrip may reduce potential disturbance to some species that are more common in the CD-29 area, such as yellow-billed loon and long-tailed duck, but may increase disturbance to species that are more common in the area of the APF-3, such as king eider, and nesting tundra swans.

Obstruction to Movement

Under Alternative B FFD, any potential obstruction to movement may be slightly reduced compared to Alternative A FFD by the elimination of the CD-29 site and associated pipeline.

Mortality

Mortality resulting from collisions with vehicles would be less in Alternative B FFD than in Alternative A FFD because of the reduction in the road system, in addition to the reduction in access to local traffic in Alternative B. Mortality from collisions with aircraft would be similar in Alternative B FFD and Alternative A FFD, although fewer seabirds might be affected by placement of the airstrip at APF-3 compared to at CD-29. The potential for subsistence hunting to affect birds would be reduced compared to Alternative A FFD by the elimination of access roads to the Kalikpik-Kogru Rivers Facility Group.

TABLE 4B.3.3-4 CPAI AND FFD ALTERNATIVE B – POTENTIAL BIRD NESTS DISPLACED BY HABITAT LOSS OR ALTERATION AND DISTURBANCE

CPAI Alternative B Totals					
Bird Group	Gravel	Dust	Ice	Airstrip^a	Total
Waterfowl	7	1	6	22	35
Loons	1	0	1	3	4
Ptarmigan	1	0	1	2	4
Seabirds	1	0	1	3	5
Shorebirds	50	10	53	0	113
Passerines	24	5	27	0	57
Total Nests	83	17	89	30	218
FFD Alternative B Totals					
Bird Group	Gravel	Dust	Ice	Airstrip^a	Total
Waterfowl	29	11	10	41	91
Loons	4	1	1	6	12
Ptarmigan	3	1	0	5	9
Seabirds	4	2	1	5	12
Shorebirds	254	77	84	0	415
Passerines	130	41	43	0	214
Total Nests	424	133	139	57	753

Notes:

^a Disturbance at airstrips would potentially reduce nesting by 50% within 500 meters of airstrip for waterfowl, loons, and seabirds.

No disturbance was evident for shorebirds and passerines (Johnson et al. 2003b).

4B.3.4.3 Alternative B – Summary of Impacts for Alternative B (CPAI and FFD) on Birds

Potential impacts to birds associated with construction and operation of the proposed development include: habitat loss, alteration, or enhancement; disturbance and displacement; obstructions to movement; and mortality. To determine the level of effect, we evaluated the nesting densities of bird species groups around the area of each proposed development and evaluated the number of nests potentially exposed to the action. In most cases, effects would involve a few individuals and would be localized, and no adverse effects to populations would be expected. Habitat loss does not involve the direct loss of active nests because winter gravel placement, ice-road construction, snow dumping, and snowdrifting occurs when nests are not active. Most impacts would be initiated during the construction period, including gravel placement, grading of the gravel surface, placement of all facilities, and initial drilling. The results of these activities for Alternative B for both the CPAI alternative and the FFD alternative are presented in Table 4B.3.3-4.

4B.3.4.4 Alternative B – Potential Mitigation Measures (CPAI and FFD) for Birds

Potential mitigation measures would be the same as those identified for Alternative A (Section 4A.3.3).

4B.3.5 Mammals

4B.3.5.1 Terrestrial Mammals

Alternative B – CPAI Development Plan Impacts on Terrestrial Mammals

Alternative B would include 10 miles of road and 35.5 miles of pipeline (Figure 2.4.2.1-1). Alternative B would have 15.8 fewer miles of road than Alternative A (Figure 2.3.3.1-1). The length of pipeline in Alternative B is 1.5 miles less than in Alternative A. The primary pipeline route is similar to that in Alternative A and follows a southwest-northeast oriented corridor from CD-2 in the Colville River Delta to the proposed CD-5, CD-6, and CD-7 production pads in the vicinity of Fish and Judy creeks. Alternative B differs from Alternative A in that the CD-6 site and the pipeline to it are moved to the southeast, out of the 3-mile setback around Fish Creek. Also, no road accompanies the pipeline from CD-2 to CD-6, and Alternative B has airstrips at CD-5 and CD-6. This configuration results in 15.8 fewer miles of road/pipeline combination in Alternative B than in Alternative A. As in Alternative A, no road accompanies the pipeline from CD-1 to CD-3. Important characteristics of Alternative B with regard to impacts on terrestrial mammals include the limited amount of road connecting most production pads, pipelines elevated to 5 feet, use of the roads by industry only, and airstrips at CD-3, CD-5, and CD-6.

Construction Period

Direct Habitat Loss, Alteration, or Enhancement

During the winter construction period, habitat would be lost or altered by placement of gravel fill and ice roads. Alternative B would require a total of approximately 195 acres of gravel fill for roads, pads, and airstrips. This is 75 fewer acres of gravel fill than Alternative A. Sixteen miles of ice road (approximately 35 feet wide) would be necessary for the winter construction of the pipeline from CD-1 to CD-6. An ice road would be constructed to transport gravel from the Clover Potential Gravel Source near the Ublutuooh River. Under Alternative B there would be slightly less direct loss of riparian habitat near the Nigliq Channel and the Ublutuooh River, which is generally important to terrestrial mammals on the North Slope. One existing arctic fox den in the Fish-Judy Creeks Facility Group could be affected by the construction of CD-5 and its associated airstrip (Burgess et al. 2002). Small mammals would lose less habitat to gravel fill than under Alternative A. See the Operation Period section under Alternative B, following, for quantification of habitat types lost or altered under gravel fill.

Obstruction of Movements

Winter movements of caribou could still be obstructed at construction sites as in Alternative A, but the effect might be less between CD-2 and CD-6 with construction of a pipeline but not a gravel road. Considering the tendency for caribou in winter to move less, to readily cross linear structures, and to occur at relatively low densities (less than 1 per km²) in the Plan Area, the obstruction to movements of caribou from construction of Alternative A and Alternative B would be similarly small in magnitude. The siting of CD-6 outside of the Fish Creek riparian zone under Alternative B could result in less obstruction of movements of moose or muskoxen there. Effects on other terrestrial mammals during construction would be similar to those for Alternative A.

Disturbance and Displacement

Disturbance of terrestrial mammals during the winter construction phase would be mainly from noise and human activity associated with building the roads, pads, and airstrips. All of the production sites, except CD-6, in Alternative B are in the same locations as in Alternative A. In Alternative B, the CD-6 site and the pipeline to it would be outside of the Fish Creek riparian area. There would also be no gravel road between CD-2 and CD-6 in Alternative B. This would result in less disturbance in the Fish Creek riparian area and in the vicinity of the Ublutuooh River and Nigliq Channel during the construction phase of Alternative B. However, there

would be additional construction activity and potential disturbance at the airstrips at CD-5 and CD-6 under Alternative B. The other components of Alternative B are the same as Alternative A, so the amount of disturbance during the construction phase would be comparable in these areas. As discussed under Alternative A, disturbance during construction could displace wintering caribou, muskoxen, and denning bears.

Mortality

Mortalities of terrestrial mammals associated with construction should be few and similar to those described in Alternative A.

Operation Period

Direct Habitat Loss, Alteration, or Enhancement

Alternative B would result in the loss of a small amount of habitat under gravel compared to the amount available in the Plan Area. There would be less acreage lost to gravel placement in Alternative B than in Alternative A because there would be no road between CD-2 and CD-6. Muskoxen and moose winter south of the Plan Area, and riparian areas are important foraging habitats for them in the summer (TAPS Owners 2001). Under Alternative B there would be less direct loss of riparian habitat within the Plan Area than under Alternative A. Riparian areas are also important to grizzly bears and wolverines (BLM 2003). Arctic foxes and red foxes adapt to development, so the differences in habitat loss for these species between Alternative A and Alternative B are probably negligible. Small mammals would experience less direct habitat loss with less gravel fill under Alternative B than Alternative A.

The two most important foraging habitat types for caribou in summer are Moist Sedge-Shrub Meadow and Moist Tussock Tundra (Lawhead et al. 2003; Russell et al. 1993; Jorgenson et al. 2003). The Barrens habitat type primarily provides insect-relief to caribou in summer (Jorgenson et al. 2003). The most important habitat types for muskoxen include Riverine, Upland Shrub, and Moist Sedge-Shrub Meadow (PAI 2002; BLM and MMS, 2003, and references therein). These habitat types, as well as Barrens, are the most important habitat types for grizzly bears (Shideler and Hechtel 2000; Jorgenson et al. 2003; PAI 2002 and references therein). The Riverine and Upland Shrub habitat types are also the most important habitat types for moose. These habitat types potentially lost from gravel fill (roads, pad and airstrips) under Alternative B are quantified below.

A total of 3,261 acres of Moist Sedge-Shrub Meadow are available in the Colville River Delta (PAI 2002). A habitat map is available for 171,861 acres in the NPR-A, but not for the entire area. The total area of Moist Sedge-Shrub Meadow in the habitat-typed area of the NPR-A is 39,920 acres (Jorgenson et al. 2003). A total of 52.68 acres (7.55 acres in the Colville River Delta, 45.13 acres in the NPR-A) of Moist Sedge-Shrub Meadow would be lost as a result of gravel placement (roads, pads, and airstrips) under Alternative B. The potential loss of Moist Sedge-Shrub Meadow from gravel fill is less than 0.2 percent of that available on the Colville River Delta. The potential habitat loss in the NPR-A cannot be calculated because a habitat map is not available for the entire area. However, the potential loss under gravel fill in the habitat-typed area in the NPR-A is 0.1 percent of the Moist Sedge-Shrub Meadow available in that area. In addition to effects of gravel fill, 41.55 acres (10.55 acres in the Colville River Delta, 31 acres in the NPR-A) of the Moist Sedge-Shrub Meadow habitat type would be altered by dust fallout (Table 4B.3.2-1).

A total of 627 acres of Moist Tussock Tundra habitat type are available in the Colville River Delta (PAI 2002). The total area of Moist Tussock Tundra in the habitat-typed area of the NPR-A is 47,102 acres (Jorgenson et al. 2003). No Moist Tussock Tundra would be lost or altered in the Colville River Delta under Alternative B (Table 4B.3.2-1). A total of 30.81 acres of Moist Tussock Tundra would be lost as a result of gravel placement (roads, pads, and airstrips) in the NPR-A under Alternative B (Table 4B.3.2-1). The potential loss under gravel fill in the habitat-typed area in the NPR-A is less than 0.1 percent of that available in that area. In addition to

the area affected by gravel fill, 30.01 acres of Moist Tussock Tundra habitat type would be altered by dust fallout in the NPR-A (Table 4B.3.2-1).

The combined area of Riverine and Upland Shrub habitat types in the Colville River Delta is 6,814 acres (PAI 2002). A habitat map is available for 171,861 acres in the NPR-A, but not for the entire area. The combined area of Riverine and Upland Shrub habitat types in the NPR-A is 5,390 acres (Jorgenson et al. 2003). A total of 3.88 acres of Riverine and Upland Shrub habitat types would be lost as a result of gravel placement (roads, pads, and airstrips) under Alternative B in the Colville River Delta. No Riverine or Upland Shrub habitat types would be lost or altered in the NPR-A under Alternative B. The potential loss of Riverine habitat type and Upland Shrub habitat type is less than 0.1 percent of that available in the Colville River Delta. In addition to that area affected by gravel fill, 1.86 acres of Riverine and Upland Shrub habitat types would be altered by dust fallout (Table 4B.3.2-1).

The total area of Barrens habitat type in the Colville River Delta is 19,440 acres (PAI 2002). The total area of Barrens in the habitat-typed area of the NPR-A is 1,698 acres (Jorgenson et al. 2003). A total of 3.34 acres of Barrens would be lost as a result of gravel placement (roads, pads, and airstrips) in the Colville River Delta, and no Barrens habitat type would be lost or altered in the NPR-A, under Alternative B (Table 4B.3.2-1). The potential loss of Barrens habitat is less than 0.1 percent of that available in the Colville River Delta. In addition to the area affected by gravel fill in the Colville River Delta, 1.13 acres of Barrens habitat type would be altered by dust fallout under Alternative B (Table 4B.3.2-1).

Disturbance and Displacement

Disturbance associated with operations in Alternative B would be less than that described in Alternative A. There would be considerably less vehicle traffic in Alternative B because there would be no road between CD-2 and CD-6. Vehicle traffic is the main cause of disturbance associated with oilfield roads. Conversely, aircraft traffic at two airstrips, at CD-5 and CD-6, would be higher in Alternative B than in Alternative A. This would result in more disturbance of caribou, muskoxen, grizzly bears, and moose. This impact could lessen with time, as caribou have habituated to the airstrip at Deadhorse. The placement of CD-6 and the pipeline to it outside the Fish Creek riparian area would result in less disturbance in this area. Moose, muskoxen, grizzly bears, and caribou could all use these riparian habitats. Limiting access to industry only would result in less disturbance than in Alternatives A and C, which have access by non-industry people.

Obstruction to Movements

The primary obstructions to movements of terrestrial mammals in oilfields are roads with traffic and pipelines. Alternative B would probably result in less obstruction to movements of terrestrial mammals than Alternative A. This is because there are only 10.0 miles of road/pipeline combination in Alternative B, compared to 25.8 miles of road/pipeline combination in Alternative A. This is 15.8 fewer miles of road/pipeline combination under Alternative B. Roads with pipelines are more of an impediment to caribou movement than either roads or pipelines alone (Cronin et al. 1994; Murphy and Lawhead 2000; TAPS Owners 2001). The pipelines in Alternative B would be elevated to 5 feet, as in Alternative A. This is generally adequate elevation to allow free passage of caribou, although some delay or deflection may occur. The area between CD-2 and CD-6 would have a pipeline without an accompanying road in Alternative B. This would result in less obstruction in summer of caribou of the TLH moving east or of the CAH moving west than in Alternative A. The riparian zones of the Nigliq Channel and Ublutuocho River would be crossed by only a pipeline under Alternative B, and movements of muskoxen and moose that frequently use riparian zones would be less affected than in Alternative A. The airstrips at CD-5 and CD-6 could cause some local obstruction of movements of mammals. These airstrips would be easy to circumnavigate compared to long stretches of road/pipeline combinations.

Mortality

With less road and traffic, fewer vehicle-wildlife collisions would be expected in Alternative B compared to Alternative A. As with the other alternatives, standard industry practice, BLM stipulations, and state regulation for Alternative B would include control of garbage and prohibition of intentional feeding of wildlife. This should ensure little or no impact on predator populations that could affect other terrestrial mammals and birds. In Alternative B, road access would be by industry only, so hunting mortality resulting from the road access would not occur.

Alternative B – Full-Field Development Impacts on Terrestrial Mammals

The primary characteristic of the Alternative B FFD with regard to impacts on terrestrial mammals is the partial network of roads connecting the facilities. The pipeline routes in Alternative B are similar to those of Alternative A, although there is some different routing among the alternatives to several of the sites in the Fish-Judy Creeks Facility Group. The Alternative B pipelines would be elevated to 5 feet, as in Alternative A, and access to the production sites would be by industry only.

The total amount of gravel fill under Alternative B would be 1150 acres, versus 1,400 acres for Alternative A, including 465 acres for pads/airstrips, and 685 acres for roads. Because neither detailed site locations nor habitat mapping are available, we cannot quantify specific terrestrial mammal habitat lost under Alternative B. However, Alternative B has considerably less acreage covered with gravel than Alternatives A or C (for example, 247 acres less than Alternative A) and thus less direct loss of vegetated habitat. More than half (60 percent) of the Alternative B gravel would be roads, with associated impacts.

Colville River Delta Facility Group

Characteristics of Alternative B FFD that differ from Alternative A FFD that would potentially affect terrestrial mammals in the Colville River Delta Facility Group are only those associated with differences between these alternatives for the ASDP. The additional FFD plan is the same for Alternatives A and B in the Colville River Delta.

Direct Habitat Loss, Alteration, or Enhancement

Under the Alternative B FFD, the amount of habitat directly lost to caribou, moose, and muskoxen for foraging in the Colville River Delta Facility Group would be the same as that associated with the Alternative A FFD.

Disturbance and Displacement

Disturbance and displacement of terrestrial mammals in Alternative B FFD would be comparable to those of Alternative A, because the infrastructure would be the same. Alternative B would allow only industry access to roads in the Plan Area, and this would reduce the potential for disturbance and displacement compared to Alternative A.

Obstruction to Movements

Obstructions to movements of terrestrial mammals in Alternative B FFD would be comparable to those of Alternative A, because the infrastructure would be the same. Alternative B would allow only industry access to roads in the Plan Area, and this would reduce traffic and hence the potential for obstruction of movements compared to Alternative A.

Mortality

Mortality associated with Alternative B FFD should be similar to that in Alternative A. Alternative B would allow only industry access to roads in the Plan Area, and this would reduce the potential for vehicle collisions and hunter harvest compared to Alternative A.

Fish-Judy Creeks Facility Group

There are considerable differences in the FFD for Alternatives A and B in the Fish-Judy Creeks Facility Group. Under Alternative B, the CD-10, CD-8, and CD-22 sites would be accessed by a road extending northwest from CD-5. Under Alternative A, CD-8 and CD-22 are accessed by roads from the road between CD-5 and CD-7. There are also different routes in these alternatives proposed to access CD-23, CD-24, CD-17, and CD-26. Most notably, in Alternative B, the hypothetical APF-2 processing site is farther east of Judy Creek than in Alternative A, and there is no road accompanying the pipelines from APF-2 to the CD-23 and CD-24 sites or westward to the Kalikpik-Kogru Rivers Group. Another important difference between Alternatives A and B is the industry-only access under Alternative B.

Direct Habitat Loss, Alteration, or Enhancement

There would be considerably less gravel fill covering habitat under Alternative B FFD because there is less roadway being constructed than in Alternative A FFD. The primary locations of roads in Alternative A that are not in Alternative B are between CD-5 and CD-6 (from the ASDP), APF-2 and CD-23, and CD-23 and CD-25. However, there would be ice roads built annually connecting APF-2 to CD-23 and CD-25 across Judy Creek and Fish Creek, respectively. Given the large amount of habitat in the Plan Area and adjacent areas for terrestrial mammals, the impacts from the loss of forage habitat under Alternative B would be limited.

In Alternative B, with annual ice road construction between APF-2 and CD-23 and between CD-23 and CD-25, direct loss of denning habitats for bears would be similar to Alternative A. Direct loss of summer foraging habitat for muskoxen, moose, and grizzly bears would be less under Alternative B in the Fish-Judy Creeks Facility Group. Grizzly bears have been sighted in the area of the Fish-Judy Creeks Facility Group. Muskoxen are expected to continue expanding their range westward, and moose are primarily associated with riparian habitats on the coastal plain (Shideler and Hechtel 2000; Burgess et al. 2002; BLM 2003). Effects on winter habitats of wolves, foxes, and small mammals are expected to be similar to those under Alternative A. Loss of riparian habitat near Judy Creek and Fish Creek would be less for Alternative B than for Alternative A. Small mammals would lose less habitat to gravel fill under Alternative B than Alternative A.

Disturbance and Displacement

Because of fewer roads and less traffic in Alternative B, disturbance and displacement of caribou and other terrestrial mammals would be less than in Alternative A. This may be particularly true along Fish Creek and Judy Creek because some of the facilities are farther from the creeks in Alternative B. There would still be some level of disturbance of caribou and other mammals during the summer and winter seasons, considering the road and aircraft traffic and human activity at the production pads and processing facilities. Past surveys have found that few caribou calved in this area, so disturbance during the calving period would be similar in Alternatives A and B. Airstrips at CD-6, CD-24, and APF-3 would cause temporary disturbances to caribou. Also, disturbances to grizzly bears and muskoxen from aircraft would be greater under Alternative B than under Alternative A. Because road access is restricted to industry only in Alternative B, habituation of caribou and other mammals to industry-related activities is likely within the Plan Area because there would be less traffic and hunting by local residents.

Obstruction to Movements

Movements of caribou would be less obstructed under Alternative B than Alternative A because there would be fewer roads under Alternative B. The corridors from APF-2 to CD-23 and CD-23 to CD-25 would have only pipelines, and obstruction of movements is less likely than if there were roads with traffic. Also, in Alternative B, CD-23, CD-24, and CD-26 would not be accessed from the north along Judy Creek but instead from roads farther offset from the creek. This may mitigate potential obstruction of movements of terrestrial mammals (such as moose, muskoxen, and grizzly bears) using the riparian zone. However, data from May 2002 (Burgess et al. 2003) suggest that more wintering caribou could be exposed to an access road to CD-26 from CD-17, as proposed in Alternative B.

Caribou movements toward the coast could be obstructed by the road/pipeline from CD-5 to CD-22 in Alternative B. However, Alternative B would have less traffic (traffic would be restricted to industry only) and thus less potential obstruction of movements of caribou and other species than Alternative A. Grizzly bears, muskoxen, and moose use riparian corridors for foraging and travel, and Alternative B would reduce road development near Fish Creek and Judy Creek, potentially reducing negative impacts on movements.

Mortality

In Alternative B, with annual ice roads constructed from APF-2 to CD-23 and on to CD-25, the probability of collisions with vehicle in winter would be similar to Alternative A. The limited new gravel roads in the area would reduce the probability of vehicle collisions in Alternative B. The restriction of road access to industry would further reduce the likelihood of vehicle-caused mortality and hunter harvest.

Kalikpik-Kogru Rivers Facility Group

The primary difference between Alternatives A and B in this area is that CD-29 and its associated pipeline planned for Alternative A are not included in Alternative B. This removes potential impacts during construction, winter ice road use, and activity on the CD-29 site.

Direct Habitat Loss, Alteration, or Enhancement

Habitat loss would be the same as in Alternative A, except that habitat would not be lost at CD-29. There would be no ice road associated with construction of a pipeline to that pad. Habitat would be lost under the facilities at CD-25, CD-27, CD-28, and APF-3, and the roads among them. This could entail loss of some calving, post-calving, and winter habitats for caribou.

Disturbance and Displacement

The construction and operational activity in this area could disturb caribou and other species. Caribou occur in this area during the calving period, and disturbance from traffic on roads, aircraft, and other activity could result in displacement. Timing of activities and controlling traffic could mitigate impacts during the calving period. An airstrip at APF-3 would cause temporary disturbances to caribou and other species.

Obstructions to Movement

The entire area has been occupied by caribou during calving, post-calving, and winter seasons in the past (Figures 3.3.4.1-1, 3.3.4.1-2, and 3.3.4.1-3). The area just south of the Kogru River has supported relatively high densities of wintering caribou (BLM 2003). It is possible that the road/pipeline complexes in the Alternative B FFD would obstruct or deflect caribou movements to some extent. The use of pipelines elevated to 5 feet and separation of roads and pipelines by more than 300 feet would mitigate this impact.

In Alternative B, large groups of TLH caribou in the area during calving and the summer season would not encounter a pipeline from CD-28 to CD-29 (as proposed in Alternative A) south of the Kogru River. Although

elevated pipelines are not usually a barrier to movement, the lack of the pipeline and CD-29 facility in Alternative B reduces the potential for deflection and delay of movements.

Mortality

There could be some mortality of terrestrial mammals associated with road traffic under Alternative B. Limiting road access to industry would likely limit this impact. The smaller amount of road under Alternative B compared to Alternative A would also reduce this impact.

Alternative B – Summary of Impacts (CPAI and FFD) on Terrestrial Mammals

The CPAI Development Plan Alternative B would cover 194.8 acres of undeveloped land with gravel fill. This is a small percentage of the land in the Plan Area, and 75.5 fewer acres than Alternative A. The amount of habitat types preferred by caribou, muskoxen, and moose that would be affected by this fill is a small proportion (less than 0.1 percent) of that available in the Plan Area. Alternative B would result in a small direct loss of terrestrial mammal habitat.

Disturbance, obstruction of movements, and mortality impacts of Alternative B would be similar to those of Alternative A. However, these impacts would be of less magnitude in Alternative B than in Alternative A because of the smaller amount of road/pipeline combinations and associated lower levels of vehicle traffic. Alternative B includes access restricted to industry, so the disturbance and hunting mortality from local resident access would not occur. The potential positive and negative aspects of hunting mortality described for Alternative A would not occur.

Alternative B FFD would cause the same impacts as those described for the CPAI Development Plan over a larger area. An exception is the potential for increased disturbance of calving caribou of the TLH in the northwestern part of the Plan Area.

Alternative B – Potential Mitigation Measures (CPAI and FFD) for Terrestrial Mammals

Appropriate mitigation measures for Alternative B will be essentially the same as those described for Alternative A. The lack of a road alongside the pipeline between CD-2 and CD-7 might make buried pipeline sections unnecessary.

4B.3.5.2 Marine Mammals

Alternative B – CPAI Development Plan Impacts on Marine Mammals

Two components of Alternative B differ from Alternative A and would affect marine mammals. First, in Alternative B, there is no road bridge over the Nigliq Channel between CD-2 and CD-5. A pipeline bridge would still be constructed. Second, Alternative B includes airstrips at CD-5 and CD-6 that are not included in Alternative A.

Ringed Seal and Bearded Seal

The impacts to ringed seals and bearded seals under Alternative B would be similar to those occurring under Alternative A during both construction and operation of the ASDP. The additional airstrips in Alternative B could result in greater air traffic over the nearshore Beaufort Sea that could disturb seals. Large oil spills could have effects that are far-reaching enough to affect seals. For a discussion of the impacts of oil spills and the likelihood of a large spill during fall migration, see Section 4.3.

Spotted Seals

The impacts to spotted seals expected under Alternative B would be less than those expected under Alternative A. The elimination of the road bridge over the Nigliq Channel would remove the potential disturbance of seals by construction and vehicle traffic. Hunter access would not be enhanced (as it would under Alternative A) without the road/bridge at the Nigliq Channel. Construction impacts would be the same as under Alternative A because the pipeline bridge would still be built across Nigliq Channel. There is also the potential for increased disturbance from air traffic at CD-5 and CD-6 under Alternative B.

During construction and drilling, access to CD-5 would be by an ice road and ice bridge during the winter and by aircraft and low-ground-pressure vehicles during the summer. During the operation period, vehicular traffic between CD-2 and CD-5 would be eliminated during the summer under Alternative B. There would probably be an ice road over the Nigliq Channel each winter. Because spotted seals occur in the Beaufort Sea only in the open-water seasons of summer and early fall (PAI 2002), disturbance from vehicle traffic would not occur. Access limited to industry would not allow increased access by hunters.

Aircraft traffic over the Nigliq Channel would increase as a result of the elimination of the road bridge. Several flights per week would be necessary to transport personnel and equipment to CD-5, CD-6, and CD-7. Aircraft landing and takeoff plans (Figure 2.3.5-2) call for aircraft to remain at 1,000 feet altitude until 3.5 miles from the airstrip on landing and to climb to 1,000 feet within 1 mile of takeoff. Thus, aircraft would cross the Nigliq Channel at a minimum of 1,000 feet altitude. At such elevation, the potential to affect spotted seals is substantially reduced. Therefore, no additional impacts to spotted seals are expected to result from the increased aircraft traffic under Alternative B. Large oil spills could have effects that are far-reaching enough to affect spotted seals. For a discussion of the impacts of oil spills and the likelihood of a large spill during fall migration, see Section 4.3.

Polar Bears

The impacts to polar bears under Alternative B would be generally similar to those occurring under Alternative A during both construction and operation of the ASDP. However, the reduced road mileage in Alternative B would reduce the probability of vehicle-bear collisions and human-bear contact. Hunter access is not enhanced under Alternative B, so less mortality would result. Large oil spills could have effects that are far-reaching enough to affect polar bears. For a discussion of the impacts of oil spills and the likelihood of a large spill during fall migration, see Section 4.3.

Beluga Whales

The impacts to beluga whales expected under Alternative B would differ from those of Alternative A because of the lack of road bridge over the Nigliq Channel and increased air traffic to CD-5 and CD-6. As with spotted seals, belugas may occur offshore of the Plan Area in the open water season. Therefore, there would be reduced potential for vehicle disturbance and hunter access under Alternative B. Increased air traffic could cause some disturbance, but altitude restrictions would minimize this. Potential disturbance impacts to belugas during the construction period could occur during the construction of the pipeline bridge across the Nigliq Channel. Large oil spills could have effects that are far-reaching enough to affect beluga whales. For a discussion of the impacts of oil spills and the likelihood of a large spill during fall migration, see Section 4.3.

Alternative B – Full-Field Development Plan Impacts on Marine Mammals

Full-field development under Alternative B calls for the same production pads as Alternative A in the Colville River Delta Facility Group and the Fish-Judy Creeks Facility Group but eliminates CD-29 in the Kalikpik-Kogru Rivers Facility Group. There is an alternate road route from CD-10 to CD-22. The impacts to marine mammals expected under Alternative B would not be appreciably different from impacts expected under

Alternative A FFD. Exceptions include the potential that impacts from CD-29 and local access (hunter access) under Alternative A would not occur under Alternative B.

Alternative B – Summary of Impacts (CPAI and FFD) on Marine Mammals

Impacts to marine mammals under Alternative B would include potential disturbance of seals and polar bears by noise during construction and operations. The limited roads, including no road over the Nigliq Channel, suggests there would be less disturbance from vehicles and more disturbance from aircraft traffic than in Alternative A. There would not be access by local residents, so increased hunting harvest would not occur.

Impacts from the Alternative B FFD would have the same impacts described for the CPAI Development Plan over a larger area.

Alternative B – Potential Mitigation Measures (CPAI and FFD) for Marine Mammals

Potential mitigation measures would be the same as those identified for Alternative A (Section 4A.3.4).

4B.3.5 Threatened and Endangered Species

4B.3.5.1 Bowhead Whale

Alternative B – CPAI Development Plan Impacts on Bowhead Whale

Bowhead whales are generally not found in the Plan Area. During spring migration, bowheads are found far offshore in the lead system of the Beaufort Sea. During fall migration, most bowheads pass north of a line from Cape Halkett to Oliktok Point. Large oil spills could have effects that are far-reaching enough to affect bowhead whales. For a discussion of the impacts of oil spills and the likelihood of a large spill during fall migration, see Section 4.3. Other activities that would occur in the Plan Area under all alternatives would not affect the bowhead whale population, habitat, migration, foraging, breeding, survival and mortality, or critical habitat.

Alternative B – Full-Field Development Plan Impacts on Bowhead Whale

Construction of a processing facility for FFD might require a sealift to transport processing facilities. This could result in impacts to bowhead whales from noise, pollution, disturbance, and vessel strikes. However, the use of docks was determined not to be a practical means of developing the facilities proposed by CPAI or during future development (Section 2.6.4), so the use of sealifts is uncertain.

Alternative B – Summary of Impacts (CPAI and FFD) on Bowhead Whale

The potential impacts from Alternative B would be the same as those for Alternative A, except there would be increased air traffic to the CD5 and CD6 sites. This is also the case under FFD Alternative B, in which there would also be more airstrips than in Alternative A.

Alternative B – Potential Mitigation Measures (CPAI and FFD) for Bowhead Whale

Potential mitigation measures would be the same as those identified for Alternative A (Section 4A.3.5).

4B.3.5.2 Spectacled Eider

Alternative B – CPAI Development Plan Impacts on Spectacled Eider

Construction Period

Habitat Loss, Alteration, or Enhancement

The proposed infrastructure in the CD-3 and CD-4 areas under Alternative B is the same as that proposed for those sites under Alternative A. Potential impacts to spectacled eiders from habitat loss and alteration at the CD-3 and CD-4 sites would be the same as those discussed for Alternative A. At the CD-5, CD-6, and CD-7 sites, the overall amount of habitat lost because of gravel placement under Alternative B would be reduced compared to Alternative A by the elimination of the road connecting CD-6 with CD-5 and the Nigliq Channel Road Bridge.

Impacts to spectacled eiders related to habitat loss and alteration would be the same as those described for Alternative A. The area covered by gravel and lost as potential spectacled eider habitat would be reduced in Alternative B from Alternative A. Impacts to habitats important to spectacled eiders indicate that the total area of gravel cover for Patterned and Nonpatterned Wet Meadow habitats used by nesting spectacled eiders would be reduced in Alternative B compared to Alternatives A, C, and D in the Colville River Delta (Table 4A.3.5-1). Gravel cover and open water habitat preferred by pre-nesting spectacled eiders and used by nesting spectacled eiders would be increased in Alternative B compared to Alternatives A, C, and D in the NPR-A portion of the Plan Area (Table 4A.3.5-2). Gravel cover for two wet habitats used by spectacled eiders for nesting would be reduced in Alternative B compared to Alternatives A and C (Table 4A.3.5-2). Impacts to spectacled eider habitat from dust would be reduced by the elimination of roadways in Alternative B, although impacts from ice roads would be increased during the construction period (Table 4A.3.5-1 and Table 4A.3.5-2). The number of pre-nesting spectacled eiders and spectacled eider nests potentially displaced by gravel fill in Alternative B would be less than one. In all cases, the proportion of available habitats affected by gravel fill in the Colville River Delta and in the NPR-A portion of the Plan Area would be less than 1 percent (Table 4A.3.5-1 and Table 4A.3.5-2).

Disturbance and Displacement

Fewer spectacled eiders would be displaced by vehicle traffic in Alternative B compared to Alternative A as a result of the reduction in the road system. Addition of the airstrip at CD-5 and CD-6 would cause additional disturbance compared to Alternatives A and C, resulting in the potential displacement of less than one pre-nesting eider and one nesting spectacled eider. This additional disturbance would occur in areas with low spectacled eider densities.

Obstructions to Movement

Potential obstruction of movement would be reduced in Alternative B compared to Alternative A by the removal of the road between CD-2 and CD-5 to CD-6. The general reduction in gravel fill would result in a reduction in potential obstruction of movements for brood-rearing spectacled eiders.

Mortality

Mortality resulting from collisions with vehicles would be reduced in Alternative B from Alternative A with the reduction in the road system. Mortality resulting from collisions with aircraft would be increased with the two additional airstrips. Mortality resulting with collisions with power lines on poles would be reduced in Alternative B from Alternative A by placement of the power lines on pipeline VSMs between CD-6 and CD-7.

Operation Period

Habitat Loss and Alteration

Some habitat loss or alteration from snowdrifts, gravel spray, dust fallout, thermokarst, and ponding would continue during project operation. These impacts would be reduced in Alternative B compared to Alternative A because of the reduced amount of gravel fill (Table 4A.3.5-1 and Table 4A.3.5-2).

Disturbance and Displacement

The effects of disturbance on spectacled eiders under Alternative B in the CD-3 and CD-4 areas would be the same as those described previously for Alternative A. At the NPR-A sites, the overall disturbance to spectacled eiders from vehicular traffic and other disturbances associated with roads would be reduced compared to Alternative A by the elimination of the road connecting CD-6 with CD-5 and the Nigliq Channel Road Bridge. The potential for disturbance related to aircraft could be increased at the CD-5 and CD-6 sites by the addition of airstrips. Disturbance related to air traffic would be increased for spectacled eiders by the addition of airstrips at CD-5 and CD-6.

Obstructions to Movement

Under Alternative B, any potential obstruction to movements of spectacled eiders in the CD-3 and CD-4 areas would be the same as that discussed above for Alternative A. At the proposed NPR-A sites, any potential obstruction to spectacled eider movement resulting from road placement would be reduced compared to Alternative A by the elimination of the road connecting CD-6 with CD-5 and the Nigliq Channel Road Bridge. Potential obstructions to spectacled eider movements related to the presence of gravel roads would be reduced in Alternative B compared to Alternative A by the reduction in the road system and the general reduction in gravel fill between alternatives.

Mortality

Under Alternative B, the potential for spectacled eider mortality related to collisions with vehicular traffic at the CD-3 and CD-4 sites would be the same as under Alternative A. At the NPR-A sites, the potential for eider collisions with vehicular traffic would be reduced compared to Alternative A because of the elimination of the road connecting the CD-6 site with CD-5 and the Nigliq Channel bridge. Potential mortality from collisions with aircraft would increase in Alternative B compared to Alternative A with the addition of airstrips at CD-5 and CD-6. The potential for spectacled eider mortality from collisions with buildings, elevated pipelines, and power lines on poles would be decreased in Alternative B compared to Alternative A as a result of the placement of all power lines on VSMs. The potential for increased depredation from raptors or ravens on spectacled eider nests would also be decreased in Alternative B compared to Alternative A by the elimination of poles that could improve foraging efficiency of raptors and ravens by providing additional vantage locations.

Alternative B – Full-Field Development Plan Impacts on Spectacled Eider

Under the Alternative B scenario for FFD, the mechanisms associated with impacts related to spectacled eider habitat loss and alteration, disturbance and displacement, obstruction to movements, and mortality in the Colville River Delta, Fish-Judy Creeks, and Kalikpik-Kogru Rivers Facility Groups would be the same as those described under Alternatives A and B for the ASDP. Potential impacts are summarized for Alternative B FFD based on pre-nesting and nesting spectacled eider densities in the Colville River Delta and the NPR-A in Table 4A.3.6.2-1. Under Alternative B of the FFD, all facilities would be moved outside of the 3-mile buffer around Fish Creek. Roads would link many of the production pads in the Fish-Judy Creeks and Kalikpik-Kogru Rivers areas, although airstrips would be situated at several sites. In the Colville River Delta Facility Group, the proposed facilities for FFD would be the same as those discussed for the FFD under Alternative A.

The effects of FFD on spectacled eiders would depend on the location and extent of development in specific locations within each area.

Colville River Delta Facility Group

A summary of the potential number of bird nests affected by the hypothetical FFD including the Colville River Delta area is presented in Table 4A.3.5-1.

Habitat Loss, Alteration, or Enhancement

Total habitat loss resulting from gravel placement would be similar in Alternative B FFD compared to Alternative A FFD, resulting in displacement of one potential spectacled eider nest (Table 4A.3.5-1). Ice roads and dust fallout would also be similar in Alternative B and Alternative A.

Disturbance and Displacement

Potential disturbance and displacement by vehicle traffic at CD-4, CD-11, and CD-12 would be reduced in Alternative B FFD compared to Alternative A FFD because of elimination of the road between CD-2 and CD-5 allowing access to the Delta from Nuiqsut. This would reduce potential traffic from the local community to these facilities.

Obstructions to Movements

Obstructions to bird movements would be reduced in Alternative B FFD compared to Alternative A FFD by the elimination of the road connecting CD-2 to CD-5. All other FFD components are similar in these two alternatives.

Mortality

Mortality from collisions with vehicles would be reduced by the reduction in the road system between Alternative B FFD and Alternative A FFD. Mortality from collisions with aircraft would be the same for Alternative B and Alternative A. Potential mortality from hunting would be reduced in Alternative B FFD compared to Alternative A FFD if increased access to Nuiqsut by the road between CD-2 and CD-5 contributed to increased harvest.

Fish-Judy Creeks Facility Group

A summary of the potential number of bird nests affected by the hypothetical FFD including the Fish-Judy Creeks Facility Group is presented in Table 4A.3.5-1.

Habitat Loss, Alteration, or Enhancement

Under Alternative B FFD in the Fish-Judy Creeks Facility Group, the overall amount of habitat loss would be reduced compared to Alternative A because of the decrease in the road system and the elimination of one well pad. However, the construction of airstrips would increase habitat loss in the immediate areas of CD-6 and CD-24. APF-2 would be moved to an area with lower shorebird nesting density.

Obstructions to Movements

Obstructions to movements of brood-rearing birds would be reduced in Alternative B FFD compared to Alternative A FFD by the reduction in the road system.

Disturbance and Displacement

Disturbance from vehicle traffic would be reduced in Alternative B FFD compared to Alternative A FFD by the reduction in the road system and reduced access for local traffic. Disturbance from air traffic would be increased by the addition of airstrips at CD-5, CD-6, and CD-24. Disturbance of spectacled eiders by facility noise would be reduced by moving APF-2 from an area of 0.01 to 0.11 birds/km² to an area of less than 0.01 birds/km². The greatest potential for vehicular traffic to affect spectacled eiders likely would occur in the vicinity of CD-6 and CD-8, along the access road from CD-8 to CD-22 where higher densities of spectacled eiders might occur (Figure 3.3.5.2.1-1).

At CD-6, the potential for aircraft disturbance to affect spectacled eiders would probably be increased compared to Alternative B of the ASDP because of the increased number of well pads and the APF-2 facility that would receive support from the airstrip at that site. The addition of the airstrip at the CD-24 site might have little effect on spectacled eiders because of the lower number of eiders in that area compared to the CD-6 and CD-8 areas (Figure 3.3.5.2.1-1).

Mortality

Mortality from collisions with vehicles would be reduced in Alternative B FFD compared to Alternative A FFD by the reduction in the road system and removal of access for local traffic. Mortality from collisions with aircraft would be increased by the addition of airstrips at CD-5, CD-6, and CD-24 (Table 4B.3.4.2-1). Local access to Nuiqsut would be eliminated for Alternative B FFD compared to Alternative A FFD to pad locations adjacent to the Colville River and Harrison Bay, potentially reducing subsistence waterfowl harvest by increased access to these areas.

Kalikpik-Kogru Rivers Facility Group

A summary of the potential number of bird nests affected by the hypothetical FFD including the Kalikpik-Kogru Rivers Facility Group is presented in Table 4A.3.5-1.

Habitat Loss and Alteration

Under Alternative B FFD, the potential for habitat loss and alteration to affect spectacled eiders in the Kalikpik-Kogru Rivers Facility Group would be slightly reduced compared to Alternative A because of the elimination of the production pad and airstrip at CD-29. The addition of an airstrip at the APF-3 site would increase habitat loss in the immediate area of that facility. Increased ice road construction resulting from the elimination of road access would increase temporary habitat alteration during construction and drilling compared to Alternative A FFD.

Disturbance and Displacement

Disturbance from vehicle traffic would be reduced in Alternative B FFD compared to Alternative A FFD because of the reduced road system. Disturbance from air traffic would be similar in Alternative B FFD and Alternative A FFD, although more spectacled eiders could be affected by the airstrip at APF-3 compared to the airstrip at CD-29 in Alternative A FFD (Figure 3.3.5.2.1-1).

Obstruction to Movement

Under Alternative B FFD, any potential obstruction to movement of spectacled eiders might be slightly reduced compared to Alternative A FFD by the elimination of the CD-29 site and associated pipeline.

Mortality

Mortality from collisions with vehicles would be reduced as a result of the reduction in the road system in Alternative B FFD compared to Alternative A FFD, in addition to the reduction in access to local traffic for this alternative. Mortality from collisions with aircraft would be similar in Alternative B FFD and Alternative A FFD, although fewer seabirds might be affected by placement of the airstrip at APF-3 rather than CD-29. The potential for subsistence hunting to affect birds would be reduced compared to Alternative A FFD because of the elimination of access roads to the Kalikpik-Kogru Rivers Facility Group.

Alternative B – Summary of Impacts (CPAI and FFD) on Spectacled Eider

Most impacts to spectacled eiders resulting from CPAI Alternative B would occur in the Colville River Delta area and would be limited to a few individuals. Spectacled eiders occur in greater numbers near proposed developments in the Colville River Delta than in the NPR-A portion of the Plan Area.

CPAI Alternative B would potentially displace one pre-nesting eider and one spectacled eider nest.

Impacts from FFD Alternative A through D for spectacled eiders are summarized in Table 4A.3.5-1.

Alternative B – Potential Mitigation Measures (CPAI and FFD) for Spectacled Eider

Potential mitigation measures would be the same as those identified for Alternative A (Section 4A.3.5.2).

4B.3.5.3 Steller's Eider

This section describes the potential impacts of the ASDP on threatened Steller's eiders. Impacts to other bird groups associated with the proposed development are described in Section 4B.3.3 and can be referred to for more detailed description of the mechanisms of specific impacts. In general, impacts to Steller's eiders potentially are the same as those described for spectacled eider under all of the alternatives. However, the likelihood of impacts occurring to Steller's eiders is very small, even under FFD scenarios, because Steller's eiders occur very rarely in the plan area. There would be a loss of potential Steller's eider habitat from the ASDP. Given the current distribution of Steller's eider in the Plan Area it is unlikely that any of the project alternatives would affect this species.